Politics and Governance
Open Access Journal | ISSN: 2183-2463
Volume 8, Issue 2 (2020)

Policy Debates and Discourse Network Analysis

Editor
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COGITATIO

Politics and Governance, 2020, Volume 8, Issue 2
Policy Debates and Discourse Network Analysis

Published by Cogitatio Press
Rua Fialho de Almeida 14, 2º Esq.,
1070-129 Lisbon
Portugal

Academic Editor
Philip Leifeld (University of Essex, UK)

Available online at: www.cogitatiopress.com/politicsandgovernance

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2020, Volume 8, Issue 2, Pages 180–183
DOI: 10.17645/pag.v8i2.3249

Editorial

Policy Debates and Discourse Network Analysis: A Research Agenda

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Submitted: 15 May 2020 | Published: 2 June 2020

Abstract
Discourse network analysis (DNA) is a combination of network analysis and qualitative content analysis. DNA has been applied to various policy processes and debates to show how policy actors are related at the discursive level, complementing coordination relations among them that are often analysed in the application of the policy networks approach. This editorial takes stock of the theoretical and methodological research frontiers in DNA and summarises the contributions of the eleven articles in the thematic issue on "Policy Debates and Discourse Network Analysis" in *Politics and Governance*.

Keywords
content analysis; discourse network analysis; policy debate; policy process; public policy; social network analysis

Issue
This editorial is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

In the study of policy processes, many theories and frameworks (Weible & Sabatier, 2017) revolve around a number of common themes: *political actors* (such as interest groups, government agencies, legislators, and scientific actors); *coalitions* in which these actors organise in order to influence policy making; the *networks* through which they engage with, and perceive, each other; the *issues*, topics, policy sectors, problems, or policy domains they are concerned with; actors' *beliefs* and interpretations and resulting belief systems, discourses, and narratives with regard to policy problems; the *timing* of decisions and opportunities; actors' *resources* and their resulting *power* and *reputation*; as well as *institutions*, broadly understood as the set of rules of the system, and their constraining or enabling forces. Policy process theories or frameworks usually combine some of these elements to explain why, how, and when policy change happens.

A strong empirical tradition in this field is the study of policy networks, which focuses on the information flows, collaboration, and exchange of resources among political actors in order to explain who gets to influence policy outcomes in any given policy domain or subsystem (Kenis & Schneider, 1991; Leifeld & Schneider, 2012). In the last ten years, this focus on the material, actual coordination networks among actors was merged with ideational approaches, such as the advocacy coalition framework (Ingold, 2011; Sabatier & Jenkins-Smith, 1993), which focus more on actors' beliefs, belief systems, policy learning, and resulting coalitions—rather intangible relationships between actors. Despite an early focus of these approaches on policy beliefs, the tools of policy network analysis were increasingly borrowed to replace the study of belief systems in advocacy coalitions by the study of coordination (e.g., Ingold, 2011; Schlager, 1995). Enter discourse network analysis (DNA). DNA is an attempt at measuring actors' policy beliefs and discourses systematically using text sources and moulding them into a data format that is compatible with policy network analysis. This endeavour serves to facilitate the joint analysis of material policy networks (the 'coordination layer') and ideational networks among the same actors (the 'discursive layer' or belief layer of subsystem politics).

Much of the methodological work on DNA has produced ways to achieve this fusion: Leifeld (2016, 2017) summarises the construction of affiliation networks, actor congruence networks, concept congruence networks, conflict networks, and normalisation methods for an effective analysis of discourse networks. These methods were implemented in the software *Discourse Network*

Analyzer, a qualitative content analysis package that permits a nested, actor-based annotation of actors' usage of 'concepts' (broadly understood as the contents they talk about, including policy preferences or arguments) and export of the resulting network data to statistical software and network analysis packages. While the resulting networks can be analysed at the actor level, concept level, or a combined two-mode level, possibly over time, the most interesting level from a policy networks perspective is the actor level: An actor congruence network connects any two policy actors if they both use the same concept—possibly in different situations or source documents—in the same way at least once. More specifically, two actors both need to co-support the same concept or co-reject the same concept for them to be connected. The more concepts any two actors agree on (positively or negatively), the larger the tie weight becomes that connects the two actors, normalised by the average number of concepts the two actors use overall. This kind of network effectively mirrors the coordination relations found in the study of policy networks: Both kinds of networks are based on actors in a policy domain, and both kinds of networks can exhibit coalitions of actors as densely interconnected parts of the network.

2. An Emerging Research Agenda

The availability and compatibility of coordination networks and discourse networks bears interesting questions: How do the coalitions found in a coordination network differ from the coalitions found in a discourse network? How do the two kinds of relations influence each other? Can we simply employ DNA as a cheap-to-collect proxy measure for actual coordination? Policy networks are typically measured through interviews or surveys of elite actors, usually making repeated collection of such data prohibitively expensive. Discourse network data still require a big manual annotation effort, but changes over time can be recorded more effectively, to the extent that it becomes possible to trace the emergence and erosion of coalitions before important reforms happen (Leifeld, 2013; Leifeld & Haunss, 2012). Are coordination relationships stable over time while discourse networks are volatile or cyclical? How do discourse networks vary across different arenas, policy domains, and types of source documents? Do actors spontaneously and independently exhibit discursive similarities in a debate, or do they influence each other directly (through the sources being analysed) or indirectly (by means of influencing public opinion, which in turn changes other actors' beliefs)? Does a segregation of actors into clusters, or coalitions, imply that the coalitions are in conflict with each other ('polarisation') or merely that they talk past each other and follow different policy paradigms, without antagonism ('segregation´)? Are discourse networks different in consociational and majoritarian political systems? More generally, how do institutions shape the structure and development of discourse networks? With the availability of DNA, a vast research agenda in public policy is opened up to systematic inquiry. Empirical applications in different contexts will increasingly facilitate theoretical insights and guided comparison.

Meanwhile, DNA has been exported to adjacent problems and subfields, where the methodological toolbox proves useful for analysing ideational actor configurations more generally. In this thematic issue, for example, the contribution by Bhattacharya (2020) examines party unity among legislators using DNA; Abzianidze (2020) explores nationalist post-Soviet discourse and discursive coalitions in Georgia; and Rinscheid (2020) combines DNA with the analysis of public opinion using survey data. DNA not only proves useful for studying policy processes and debates in a positivist or realist paradigm, but increasingly attracts scholars who are interested in more traditional forms of discourse analysis (think Foucault or critical theory) and would like to add a systematic dimension to their analyses, in which they seek to uncover the power structures in society or politics through analyses of who says what. The analysis of higher education reform options in Germany by Nägler (2019) is a commendable example that seeks to describe discursive relations in a given field in an idiographic way, rather than seeking generalisation and inferring systematic cause-and-effect relationships across different contexts in a nomothetic research design (see also Leifeld, 2019, on this point). The entry barriers seem low because learning basic exploratory network analysis does not require any understanding of econometrics.

Yet, discourse networks can also be analysed from a generative perspective, not just in a descriptive, exploratory, or macro-comparative way. Few scholars have embarked on this journey so far. The first point of departure is the agent-based computational model of the emergence of polarised coalitions in discourse networks presented in Leifeld (2014), followed by an application of a relational event model—an inferential statistical model for event-based temporal network data—to discourse networks by Leifeld and Brandenberger (2019) and Brandenberger (2019). The goal of this research is to identify the micro-level mechanisms by which actors contribute concepts to the debate, for example by learning from actors who exhibited prior similar concept usage, the drive for self-consistency, and other generative mechanisms that may lead to discourse network structures resembling those measured in empirical studies (e.g., Leifeld, 2013, 2016; Leifeld & Haunss, 2012). Identifying the generative mechanisms behind policy debates as dynamic networks will be key to prediction and systematic comparison of discourse networks.

In addition to theoretical puzzles, several methodological research fronts will need to be addressed to permit better theory-led research. Among them are the identification of opinion leaders and other central positions in discourse networks by taking into account whose concepts diffuse the most; the measurement of polarisation between competing coalitions and how it changes

over time; the systematic analysis of self-contradictions by actors and actors' loyalty to concepts; the scaling of actors' ideological positions as well as concepts on one or two dimensions for better comparison; the development of better generative models for discourse networks; (semi-)automatic annotation in lieu of manual annotation of actors' concepts; the development of intercoder reliability measures for DNA; and the sparsification of, or identification of significant ties in, discourse networks, to name just a few promising examples of how DNA research could be improved significantly.

3. Contributions in This Thematic Issue

The articles in this thematic issue contribute to the goals outlined in this overview of the discourse network research agenda—methodologically, theoretically, or by means of comparison. The first article by Schaub and Metz (2020) compares policy networks with discourse networks using a case study of micropollutants in water bodies. They find that both approaches reach similar coalition structures but have subtle differences in terms of actor composition. Kukkonen and Ylä-Anttila (2020) employ DNA in the second article to analyse the science–policy interface in Finnish climate politics: an application of the DNA lens to a theoretical problem centred around a specific group of actors—scientists—and their connections to policy. Ghinoi and Steiner (2020) apply DNA to another specific group of actors—legislators from different parties—in their analysis of the climate debate in the Italian parliament. In the fourth article of this thematic issue, Bhattacharya (2020) introduces DNA to the comparative study of legislative politics by measuring party unity and party control in the German parliament with DNA, in a case study of the German response to the Euro crisis and the Greek bailout. This is a promising avenue for future research as we ultimately want to understand if and how discourse networks influence legislative behaviour and decisions. Abzianidze (2020) applies DNA to nationalist discourse and ethnic conflicts during Georgia's post-Soviet democratisation process, making use of the rich toolbox of social network analysis by applying structural equivalence, multidimensional scaling, and hierarchical cluster analysis. This extends the use of DNA to a new application domain. In the sixth article of this thematic issue, Wallaschek, Starke, and Brüning (2020) map and contrast the discourse networks around different types of solidarity in the public sphere in Germany. Černý and Ocelík (2020) apply DNA to uncover polarised advocacy coalitions in the debate on energy supply and the phasing out of coal in the Czech Republic. Rinscheid (2020) analyses energy policy in the Swiss context and focuses specifically on how incumbent business interest groups can appeal to voters. He combines DNA with public opinion surveys, which is an important avenue for learning more about the channels through which actors ultimately seek to influence policy making. In the ninth article, Howe, Stoddart, and Tindall (2020) show how more media coverage of an actor is associated with higher perceived influence in the policy network, but not for individual activists. The authors thus link the discursive and policy network levels using regression models. Bossner and Nagel (2020) analyse Twitter messages during *BBC* 'Question Time' on 2 June 2017—the final media encounter of Prime Minister Theresa May and her Labour Party contender in the context of the 2017 UK election campaign. They apply DNA primarily to the content categories of the debate and how groups of actors were related to types of content, which is a departure from actor-centred applications of DNA found elsewhere. The 11th and final article of this thematic issue by Haunss et al. (2020) makes a methodological contribution by comparing the speed and reliability of manual annotation of actors' statements and semi-automatic annotation supported by machine learning. They find that an integration of manual and computer-supported annotation may not speed up annotation significantly, but may be able to reproduce the core of a discourse network with high reliability. Overall, the contributions in this thematic issue demonstrate the breadth of applications and methodological developments pertaining to discourse networks and the analysis of policy debates using DNA.

Conflict of Interests

The author declares no conflict of interests.

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COGITATIO

Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 184–199
DOI: 10.17645/pag.v8i2.2597

Article

Comparing Discourse and Policy Network Approaches: Evidence from Water Policy on Micropollutants

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Submitted: 30 October 2019 | Accepted: 2 May 2020 | Published: 2 June 2020

Abstract
To understand how actors make collective policy decisions, scholars use policy and discourse network approaches to analyze interdependencies among actors. While policy networks often build on survey data, discourse networks typically use media data to capture the beliefs or policy preferences shared by actors. One of the reasons for the variety of data sources is that discourse data can be more accessible to researchers than survey data (or vice versa). In order to make an informed decision on valid data sources, researchers need to understand how differences in data sources may affect results. As this remains largely unexplored, we analyze the differences and similarities between policy and discourse networks. We systematically compare policy networks with discourse networks in respect of the types of actors participating in them, the policy proposals actors advocate and their coalition structures. For the policy field of micropollutants in surface waters in Germany, we observe only small differences between the results obtained using the policy and discourse network approaches. We find that the discourse network approach particularly emphasizes certain actor types, i.e., expanders who seek to change the policy status quo. The policy network approach particularly reflects electoral interests, since preferences for policies targeting voters are less visible. Finally, different observation periods reveal some smaller differences in the coalition structures within the discourse network. Beyond these small differences, both approaches come to largely congruent results with regards to actor types, policy preferences and coalition structures. In our case, the use of discourse and policy network approaches lead to similar conclusions regarding the study of policy processes.

Keywords
agenda-setting; discourse network analysis; micropollutants; policy change; policy network analysis; risk governance; water policy

Issue
This article is part of the issue “Policy Debates and Discourse Network Analysis” edited by Philip Leifeld (University of Essex, UK).

1. Introduction

The network lens is an analytical approach to policymaking, which emphasizes that policies are adopted in a bargaining process between multiple actors. These actors participate in advocating and formulating policies and include political parties, interest groups or administrative units. As no single actor has sufficient decision-making power, scholars adopt the network lens to uncover the complex interdependencies among actors in policymaking processes. Scholars of policy process have employed the network approach as an analytical tool either: a) to describe the variety of actors, their policy positions and their relationships to one another; or b) to determine an-

alytically how actors' interactions shape the outcomes of policymaking processes (Howlett, 2002).

As popularity for the network lens has increased, so too have the number of different network approaches (Adam & Kriesi, 2007; Börzel, 1998). One important strand of the literature draws attention to 'policy networks.' Policy networks are defined as entities composed of organizations involved in the formulation or implementation of public policies (Fischer, 2017). The concept has its roots in the literature on the organizational state (Laumann & Knoke, 1987) and collective action (Laumann, Pappi, & Rossi, 1976). According to this literature a multitude of actors participates in policymaking. The actors depend on each other to make collective decisions. These interdependencies are conceptualized in networks by nodes and ties. Examples of nodes in policy networks are interest groups, political parties, administrative units, experts, and other actors involved in policy processes. These can be linked by ties of cooperation, information exchange or conflict. In this article, we adopt a narrow definition of policy networks by focusing on actors solely involved in policy formulation, i.e., the production of policy outputs. The policy network approach serves to systematically test theoretical mechanisms guiding the production of policy outputs.

Another body of literature focuses on 'discourse networks' (Leifeld, 2017). While the literature on discourses is broad, its various strands converge on the claim that discourses matter in politics. Verbal interventions constitute important elements of political mobilization, conflict and decision-making (Leifeld & Haunss, 2012). Classic works on critical discourse analysis (Foucault, 1991) and deliberative democracy (Habermas, 1981) paved the way for more empirical analytical approaches, such as the discourse network approach. Discourse networks are defined as verbal interactions between political actors which make public statements conditional on each other about a given policy (Janning, Leifeld, Malang, & Schneider, 2009; Leifeld, 2016, 2017). Accordingly, actors constitute the nodes in discourse networks, while shared policy preferences expressed via public statements represent the ties. The discourse network approach is an analytical tool used to systematically test the theoretical mechanisms guiding the development of policy debates.

Both discourse and policy network approaches have been used to elucidate the policymaking process, but it remains unclear whether both approaches yield similar results regarding policy change. For example, Leifeld (2013) and Bulkeley (2000) analyze policy change by studying the formation of coalitions based on the discourse network approach, while Ingold (2011) and Fischer (2014) employ the policy network approach for the same purpose. It remains unclear whether such studies would have come to the same results if they had used the respective other approach. To close this research gap, we ask: Which aspects of policy change do the different analytical frameworks emphasize?

This article compares similarities and differences between the two types of network approaches in four steps: First, we analyze differences in the participation of actors. Some scholars conceptualize discourses and policy processes as two different arenas of political participation (Binderkrantz, Christiansen, & Pedersen, 2015; Wolfe, Jones, & Baumgartner, 2013). Organizations may opt to participate in the discourse if they do not have access to formal decision-making. We therefore compare how accessible both types of networks are to different actors.

Secondly, we compare policy preferences of actors. Studies on discourse networks have relied on the content analysis of texts, e.g., media articles or parliamentary debates, in order to gather data on actors participating in the discourse and their policy preferences (Fisher, Leifeld, & Iwaki, 2013; Leifeld, 2013). By contrast, numerous studies on policy networks have relied on surveys (e.g., Henry, 2011; Ingold & Fischer, 2014). Here, we compare actors' policy preferences in discourse and policy networks in order to understand whether results differ systematically.

Thirdly, we scrutinize the formation of coalitions. Coalitions refer to subgroups of actors with shared policy preferences (Fischer, 2017). Actors form coalitions as a strategy to pool resources among likeminded others and influence policymaking in line with their preferences. In policy processes, it is typical for several competing coalitions to exist, such as a pro-change and a pro-status quo coalition. Here, we analyze whether discourse and policy networks fall into the same coalition structures. With structures, we mean the overall existence, number and strength of competing coalitions rather than the composition of coalitions. Consequently, the same coalition structures (e.g., two opposing coalitions) can be in place, even if coalitions themselves are not composed of the same actors.

Fourthly, we investigate the degree to which different observation periods influence results. The policy cycle model conceptualizes policymaking as a series of consecutive stages (Easton, 1965). Networks that reflect the agenda-setting phase of the policy process may look different to those that capture the decision-making phase. Time-stamped data are available for discourse networks, which rely on coded media data, but are difficult to gather for policy networks, which rely on survey data. We compare differences between discourse networks analyzed over time and policy networks for one point in time.

We rely on a case from German water protection policy. An emerging issue in water protection concerns micropollutants, i.e., chemical substances that end up in water bodies in small concentrations but nevertheless raise concern due to their potential adverse health effects on humans and the environment (Metz, 2017). Actors involved in policy discourse and policy formulation have debated on how to address the issue. Potential policy solutions address consumers, agriculture or industry in order to reduce the use of potential pollutants at the source. An alternative policy approach addresses the

problem from the 'end-of-the-pipe' by treating polluted wastewater in sewage plants (Triebskorn et al., 2019).

The goal of this study is to uncover differences and similarities between discourse and policy networks in order to comprehend whether both types of analyses produce similar results regarding policy change in democratic states. This article provides researchers with insights into three key aspects of policy change: a) the accessibility of policy venues (discourse/policy formulation) to actors; b) policy proposals actors advocate; and c) coalition structures. These insights should improve researchers' understanding of what they can infer about policy processes from the data they have gathered. Providing clarity is relevant in order to understand whether both network approaches can be used to answer similar research questions and empirically test the same theories.

2. Expectations of Differences and Similarities between the Network Approaches

2.1. Actor Participation

The literature on agenda-setting and policy narratives suggests that we can expect differences between discourse and policy networks (Baumgartner, Berry, Hojnacki, Leech, & Kimball, 2009; Jones, McBeth, & Shanahan, 2014). We argue that these differences can be attributed to the differences in actor participation between the two networks.

The idea underlying why actors participate in policy discourse is that they try to influence public opinion in order to affect the dynamics of political competition (Tosun & Schaub, 2017). The literature of comparative politics has shown that public opinion influences policy decisions (Mühlböck & Tosun, 2018; Wlezien, 2004). Based on the work of Schattschneider (1960) and Baumgartner et al. (2009), one can infer that not every actor in a policy field is interested in participating in the discourse and drawing attention to a policy issue. Politics is conceptualized as a conflict in which competing actor coalitions strive to influence policymaking (Weible, Sabatier, & McQueen, 2009). Depending on whether these actor coalitions aim for policy change or to preserve the status quo, they tend to use different strategies and use different venues (Baumgartner et al., 2009; Jones et al., 2014). Actors can be categorized as 'containers' and 'expanders' (Cobb & Coughlin, 1998; Jones et al., 2014). 'Containers' are actors with an interest in preserving the policy status quo. They typically aim to minimize the level of public attention on an issue and, therefore, avoid participation in a public discourse. Regarding environmental policy, industrial associations are less likely to participate in the discourse because they try to avoid public attention that could result in stricter regulation. Instead, these actors prefer to establish direct links to decision makers and exert influence in policy networks through participation in 'polycentric' institutional arrangements (Fischer, Angst, & Maag, 2017; Leifeld & Schneider, 2012). This especially holds true in corporatist political systems (Christiansen, Mach, & Varone, 2018). On the contrary, 'expanders' are actors with an interest in changing the policy status quo, though they often have limited access to decision makers and policy networks or find themselves in a weak bargaining position. In their need to adapt and use different strategies, these actors resort to public discourse. In environmental policy, these actors are usually environmental or consumer protection organizations with an interest in stricter regulation (Tosun & Schaub, 2017). For such new or marginalized actors, public discourse is a venue comparatively easy to access. Their goal is to steer public opinion by dominating the discourse and attracting media attention, since this exerts pressure on decision makers (Baumgartner et al., 2009; Jones et al., 2014; McCombs & Shaw, 1972). Based on these considerations, we assume that both network approaches reveal some differences with regard to the actors participating in policymaking:

> Expectation 1a: The policy network approach should emphasize the participation of containers in the policymaking process;
>
> Expectation 1b: The discourse network approach should emphasize the participation of expanders in the policymaking process.

In addition, we expect both approaches to reveal similarities concerning the participation of political-administrative actors, which are usually central to both policy and discourse networks. Policy networks represent the venue in which these actors typically play an important coordination role. Additionally, political-administrative actors tend to participate in public discourse, often in an effort to sensitize the population. Therefore, we categorize these actors as a third group and expect both approaches to reveal their presence:

> Expectation 1c: Discourse and policy network approaches should equally emphasize the participation of political-administrative actors in the policymaking process.

To summarize, we expect any study employing either the discourse or the policy network approach to reveal differences in the types of actors participating in policymaking. Participation depends on whether actors want to preserve or change the policy status quo. Only political-administrative actors are expected to be present in equal degrees.

2.2. Actors' Policy Preferences

Discourses in democratic countries ideally resemble deliberative arenas, while policy processes have to follow stricter institutional rules. In the ideal model of a deliberative democracy (Habermas, 1996), actors can freely par-

ticipate in discourses. In a policy debate, state and non-state actors can participate and express their preferences based on their causal beliefs. The discourse network approach should, therefore, represent a broad spectrum of actors and policy proposals.

By contrast, policy processes are governed by formal and informal rules of participation that restrict access to decision-making and, thereby, the spectrum of discussed policy proposals. Formal rules attribute decision-making power and responsibility for the design and content of policies to elected state actors (Moe, 1990; Trebilcock & Hartle, 1982). Informal rules provide a few non-state actors, which have a stake in or knowledge on a particular policy issue, with access to policy processes. In the formal policymaking process, actors are less likely to propose unpopular policies that target their respective constituency, because it can be costly for target groups to implement such a policy (Metz & Ingold, 2017). Since elected state actors are dependent on votes, they are unlikely to express policy preferences that target their electorate and would impose costs on their voters. In fact, German citizens disapprove of policy measures such as taxes or fees that would entail personal costs (Tosun, Schaub, & Fleig, 2020). Likewise, non-state actors are likely to block policies that would impose the burden of implementation on the economic or civil society groups whose interests they represent. We expect the network approach to reflect the vested interests of those actors which have access to policy formulation. Policy proposals that do not meet the interests of respective electoral, corporate or civil society interests are likely to be neglected or rejected.

> Expectation 2: The policy network approach should more strongly reveal policy preferences that reflect respective electoral, corporate or civil society interests than the discourse network approach.

2.3. Coalitions

The concept of 'coalitions' is central to theories of policy process, e.g., the 'Advocacy Coalition Framework' (Sabatier & Jenkins-Smith, 1999), and argumentative discourse analysis (Hajer, 1993). Actors express their policy preferences in discourses and during policy formulation, and they form coalitions based on shared preferences (Leifeld, 2013; Sabatier, 1987). Opposing coalitions compete for influence on policy outputs. The coalition that dominates the discourse or policy formulation respectively has the greatest potential to shape policy outputs.

We distinguish between three ideal types of coalition structures in Figure 1 (Ingold & Gschwend, 2014): Adversarial structures with opposing coalitions and little coordination; collaborative structures with opposing but coordinated coalitions; and unitary structures consisting of one dominant coalition.

Similar coalition structures should, in principle, be observable across discourse and policy networks. In

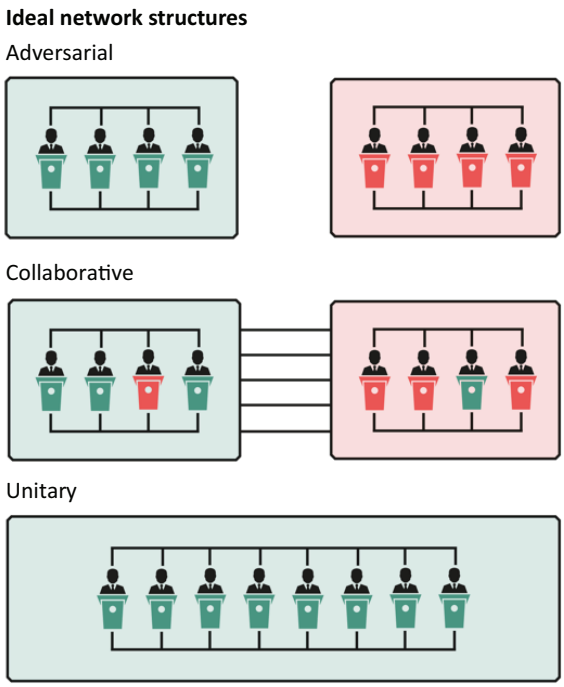


Figure 1. Three coalition structures. Source: Metz (2017).

Expectations 1a and 1b, we explained that discourse and policy network approaches are likely to reveal different actor types in policymaking. Despite such differences in participation, it is possible that both network approaches lead to the identification of similar coalition structures (adversarial, collaborative or dominant coalitions), because they each reveal the same underlying lines of conflict that shape the formation of coalitions. For example, both approaches could reveal a dominant pro-change coalition if the majority of actors in the policy discourse and in policy formulation expresses a clear preference for policy change. In both analyses, a majority of actors would cluster around pro-change preferences. We therefore expect the following similarities:

> Expectation 3: Discourse and policy network approaches should reveal similar coalition structures.

2.4. Differences in Time

In his analysis of a discourse network, Leifeld (2013) observes the evolution of the policy process from one unitary coalition towards a bipolarized discourse, and then back to a new, dominant, advocacy coalition. These observations suggest that the discourse network approach highlights the evolution of political conflict between coalitions over time.

Observing the evolution of policy processes over time is possible with time-stamped discourse data (Leifeld, 2017), but rarely feasible with policy network data. To date, the most widely applied method for gathering data on policy networks is through surveys. One would need to survey actors repeatedly in order to cap-

ture the evolution of the policy process over time, but such repeated surveys are rarely possible due to resource constraints and the objections of respondents to repeated participation (exceptions include Ingold & Fischer, 2014). To overcome this difficulty, survey data tend to capture the aggregate of actors' policy preferences and interactions during the entire policy process or during the phases that precede the survey. Due to cognitive constraints and recall difficulties, it is plausible that data on policy networks capture the phase of the policy process in which the survey took place. If the survey took place during polarization, the coalition structure of the policy networks will capture this particular point of the policy process. Our data-related expectation is as follows:

> Expectation 4: Different results between policy and discourse network approaches are due to different measurement, time and data collection methods.

To summarize, we formulate four expectations regarding the similarities and differences in actor participation, policy preferences and coalition formation. Whereas the first two expectations are derived from theory, the latter two stem from methodological considerations.

3. Case, Data, and Methods

3.1. Case

In this study, we compare policy and discourse networks in the new emerging policy field of micropollutants in surface waters in Germany. These networks are built on actors' preferences towards four different policy solutions for mitigating micropollution. We observe actors' preferences through a survey in order to construct the policy network, and through the coding of newspaper articles in order to construct the discourse network.

3.2. Data

3.2.1. Discourse Network

To analyze the discourse on micropollutants, we selected newspaper articles published in the nation-wide newspaper *Frankfurter Allgemeine Zeitung* and in at least one principal regional newspaper from each of the German states (23 newspapers in total). Relevant articles were identified by using a keyword search within the respective newspaper archives. Overall, we identified 1069 relevant articles on micropollutants between January 2013 and March 2017. The number of articles per newspaper ranges between 17 and 124. Most of the articles stem from the regional newspapers, and the geographic distribution is fairly even (see figures and tables provided in Appendix A in the Supplementary File for details). Due to duplicate articles that reproduced information provided by the German news agency *dpa* (*Deutsche Presse-Agentur*), we reduced our final sample to 770 articles. Within these articles, we coded statements that actors made on micropollutants in surface waters. More specifically, we coded whether actors agreed or disagreed with the same four policy solutions that were also put forward in the discourse: a) addressing consumers; b) taking measures in the agricultural sector; c) adapting industrial production; and d) improving filtering in sewage treatment plants (end-of-pipe). Statements were coded using the software Discourse Network Analyzer (Leifeld, Gruber, & Bossner, 2019). One of the authors and two research assistants coded the statements to ensure reliability. After coding, 63 of originally 173 actors were selected as relevant. Relevant actors are defined as organizations that are politically active across Germany or which issued at least two statements at different points in time during the observation period (see also Leifeld, 2017, on applying thresholds for participation in discourse). Selected actors issued 303 statements in total.

3.2.2. Policy Network

In 2014, we surveyed all the state and non-state actors which had participated in the legal revision of the German Surface Water Ordinance since 2008 (see Metz, 2017, for a description of the policy process and the actor identification method). With a response rate of 68.4%, we obtained policy preference data for 27 actors. In the survey, we asked respondents to indicate their level of agreement with the following statements on a four-point Likert scale: a) Reducing pharmaceutical micropollution is a consumer responsibility; b) micropollution is a responsibility of agricultural policy, c) micropollution is a responsibility of chemical policy (in order to adapt industrial production); d) measures should be end-of-pipe. Usually, the policy network approach links actors by ties of cooperation or information exchange. In this study, the policy network is built on shared policy preferences to enhance comparability with the discourse network approach. The data were not originally collected for this comparative study; however, the comparison is possible as both the survey questions and the statements coded in the discourse measure the same concepts, i.e., actors' preferences regarding the same four policy solutions.

3.3. Methods

We apply network methodology as well as descriptive statistics to test the plausibility of our theoretical and data-related expectations. Given its' small-N research design, our study constitutes a plausibility probe, i.e., a pre-test for future theory development (Levy, 2008). In order to probe Expectations 1 and 2, we compare actor types and their policy preferences across policy and in discourse networks. We classify all actors representing the chemical and pharmaceutical industry as well as the agricultural sector as containers since we expect these to have an interest in preserving the policy status quo. Conversely, environmental and consumer protec-

tion organizations, green political parties and actors from the wastewater treatment sector were categorized as expanders since these can be expected to have an interest in changing the policy status quo. Political-administrative actors include different governmental institutions and agencies. Third-party actors include all organizations for which no clear preference towards changing or preserving the policy status quo can be expected (see Tables B1 and B2 in the Supplementary File for an overview of the actors and their membership).

For Expectations 3 and 4, we compare the structure of both networks. First, we compare the policy and the discourse networks based on the full observation period (Expectation 3). In a further step, we divide the discourse network into two observation periods ranging from 2013 to 2014 and 2015 to 2017 and then compare both discourse networks with the policy network captured in the period before 2014 (Expectation 4). Precisely, we compare one-mode networks in which actors are linked depending on whether they share preferences with regard to the four policy solutions. We compute these separately for the policy network and discourse network data. The resulting matrices contain actors in rows and columns, with cell values indicating the degree of shared policy preferences. High values indicate high similarity and low values low similarity. More specifically, we analyze 'subtract' networks; these are created by combining 'congruence' and 'conflict' networks, which means that they include both agreement and disagreement on policy solutions. In congruence networks, actors are linked if they co-support or co-reject a policy proposal. In conflict networks, actors are linked if one actor supports while the other opposes a policy. The subtract network then combines both approaches by subtracting conflict network ties from congruence network ties (Leifeld, 2017). To improve the comparability of discourse and policy networks, we normalized both networks via the 'jaccard similarity measure' (see Leifeld, 2017, and Leifeld et al., 2019, for discourse network normalization). We graph the networks by placing actors as nodes in a two-dimensional space based on their connectedness. Nodes are linked by edges if they share policy preferences. Negative edges indicating conflicting policy preferences had been removed beforehand (see Nagel, 2016, for a similar application). This approach allows researchers to evaluate the structure of networks and to identify actor clusters, since actors with higher degrees of similarity are placed closer to each other (Leifeld et al., 2019). Finally, we compare differences in subgroup structures within the networks by conducting a cluster analysis (Leifeld et al., 2019). More specifically, we apply hierarchical cluster analysis using Ward's optimization method in order to probe Expectation 3 (Jain & Dubes, 1988). To compare the two observation periods of discourse networks, we detect communities by using the 'spinglass' algorithm (Reichardt & Bornholdt, 2006).

4. Results and Discussion

4.1. Actor Participation

We expected the policy network approach to emphasize the participation of containing actors more strongly than the discourse network approach (Expectation 1a). Conversely, we expected the discourse network approach to emphasize expanding actors (Expectation 1b). Figure 2 portrays the share of containers, expanders,

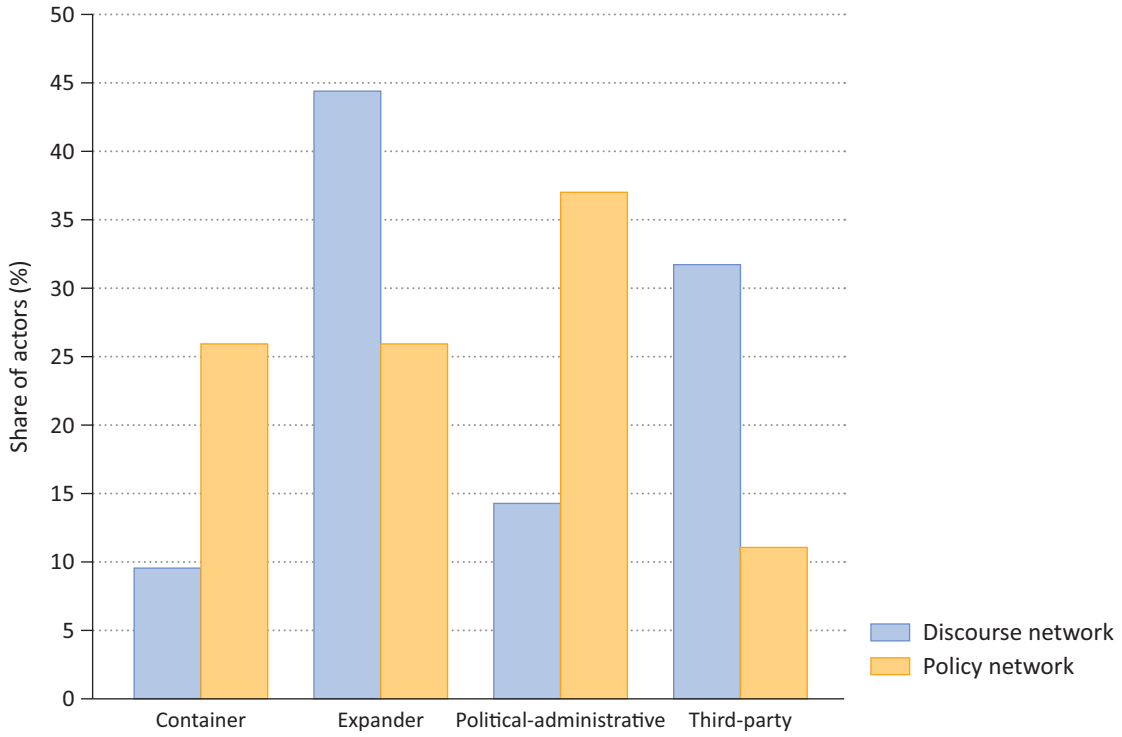


Figure 2. Emphasis of different actor types.

political-administrative and third-party actors. The results support Expectations 1a and 1b. The policy network reveals a larger share of containing actors (ca. 25%) compared to the discourse network (ca. 10%). The discourse network emphasizes expanding actors more strongly (ca. 45%) than the policy network (ca. 25%). However, Figure 2 also shows that the share of containers and expanders in the policy network is about equal. This might be a result of the efforts of political-administrative actors to include every relevant stakeholder in the policy formulation process. Thus, differences in emphasis can mostly be traced back to the discourse network, which aligns well with our theoretical argument.

Both networks reveal the presence of political-administrative actors, which is in line with our theoretical expectation. However, they are more pronounced in the policy network. The discourse network is characterized by a larger share of third-party actors. This is mainly due to the larger number of scientific institutions present in the discourse.

Figure 3 gives further details on actors' affiliations and their relative frequency within both networks. The policy network is characterized by a larger share of organizations that are affiliated with the agricultural and industrial sectors, which mostly explains the differences in containers between both approaches. The share of political-administrative actors from federal, state and regional levels is also larger, which can be explained by their coordination role in the policy network. The discourse network emphasizes political parties more strongly, mainly the German Green Party (Alliance 90/The Greens). Political parties are not represented in the policy network, because the legal proposal was exclusively discussed in the parliamentary chamber that represents the German states (German Bundesrat). Rather surprisingly, the share of environmental organizations is equal. However, this observation fits the presumption that political-administrative actors strived to include every relevant stakeholder in the legal revision.

To summarize, the policy and the discourse networks differ in their emphasis on containing and expanding actors. These differences are mostly due to the unequal distribution in the discourse network (blue bars in Figure 2). As expected, political-administrative actors are present in both networks.

4.2. Actors' Policy Preferences

Discourse and policy networks are expected not only to differ in the composition of actor types but also regarding actors' policy preferences. Specifically, we expect the discourse network to be more open to discussions on policies that are aimed at target groups, such as consumers or voters. Figure 4 depicts the share of actors that agree or disagree with each of the four discussed policy solutions in both networks.

First, we report differences in the data underlying policy and discourse network analysis. Whereas in policy networks most of the surveyed actors took a position on all four policy solutions, the discourse network is characterized by a large share of 'missing' information. Many actors present in the discourse only positioned themselves

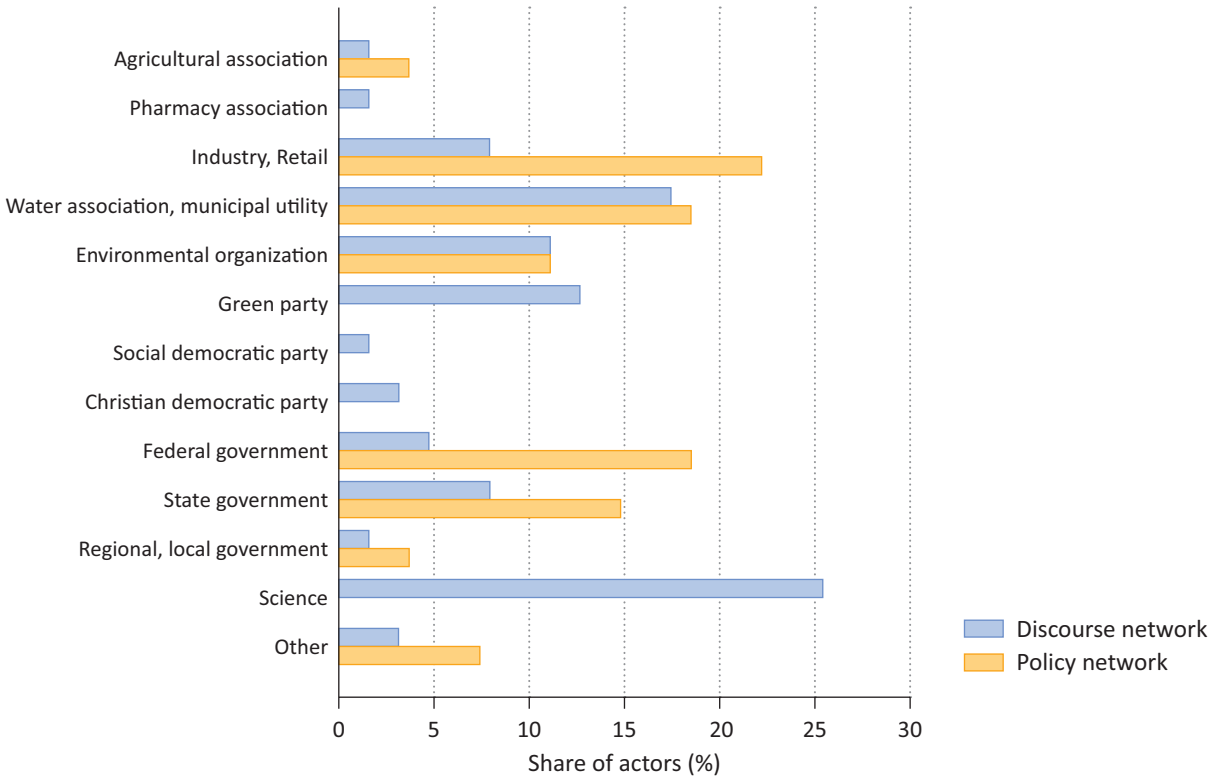


Figure 3. Presence of different actors.

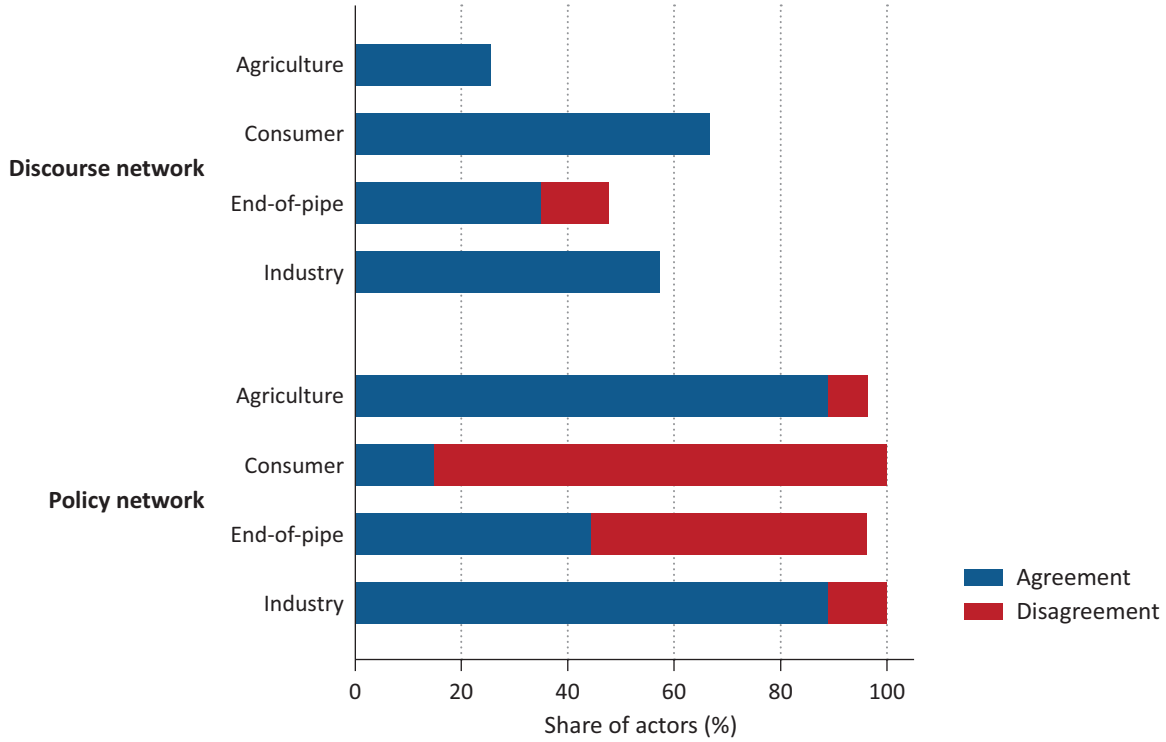


Figure 4. Agreement and disagreement on policy preferences.

on one or two of the discussed policy solutions. The differences can be traced back to the different types of data collection. Whereas surveys ask actors to indicate their preferences (agreement or rejection) from a predefined list, the discourse network approach only captures the spectrum of preferences that actors formulate. Second, and contrary to the policy network, the discourse network reveals mostly 'positive' statements in which actors indicate agreement with policy solutions.

Regarding our theoretical considerations, the policy preferences revealed by both network approaches are surprisingly similar. Agreement with measures addressing the agricultural and industrial sector is high in both networks (at least among those actors that made a statement on these measures within the discourse). Disagreement with end-of-pipe solutions is stronger in the policy network. Here, actors are divided on the question of whether end-of-pipe measures are best for mitigating the entry of micropollutants, with around 44% agreeing and 52% disagreeing. We can mainly observe differences between the approaches in the measures that address consumers. Here, opposition is stronger in policy networks; this might be due to electoral concerns as actors wish to avoid increasing costs for voters.

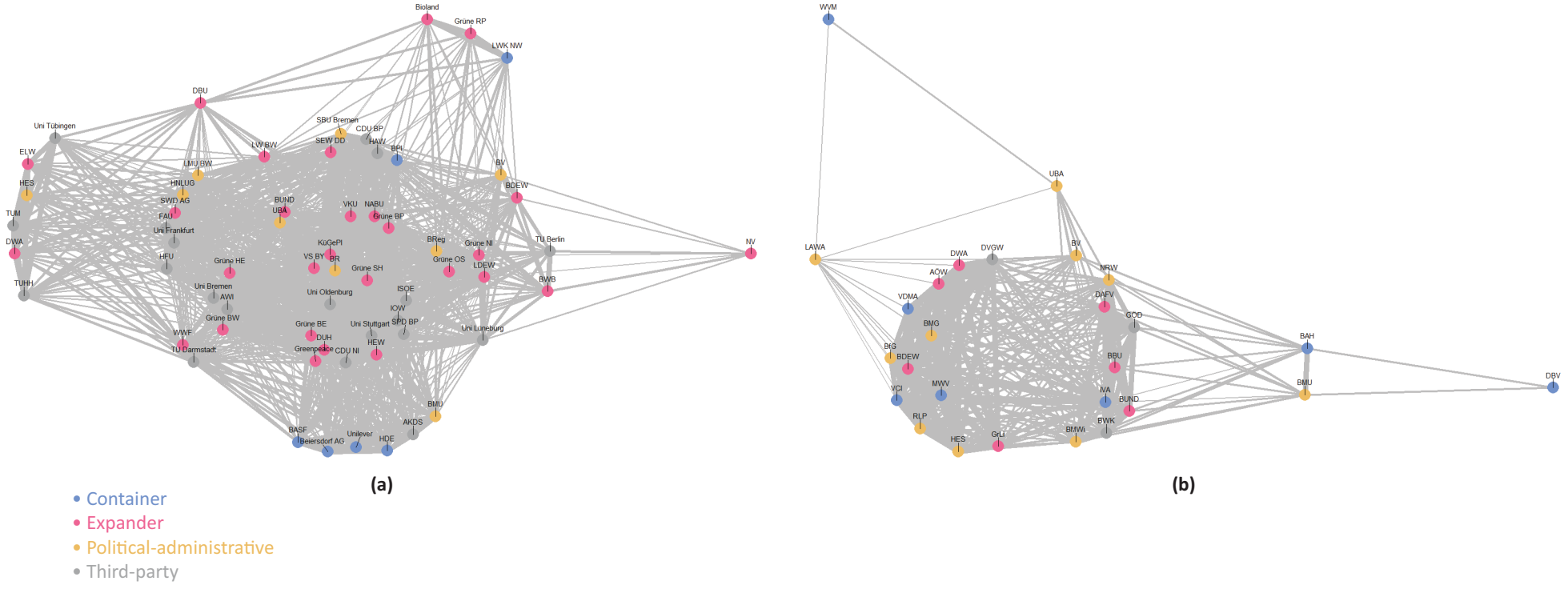
To summarize, we can observe differences in the positions taken in both networks. As predicted in Expectation 2, policies targeting consumers, i.e., voters, are less prominent in the policy than in the discourse network, which may be due to electoral concerns. Apart from this difference, similarities among the policy proposals put forward in both networks are surprisingly high. In contrast to Expectation 2, results do not particularly emphasize the policy preferences of corporate interests in the policy network. In the latter, only few actors reject policies targeting agriculture or industry.

4.3. Coalitions

We expected discourse and policy networks to reveal similar network structures regarding the formation of coalitions. Figure 5 gives a first visual impression of the structure and the composition of subgroups within both networks.

Polarization in the discourse network is rather low. In fact, most actors cluster in the middle as they share policy preferences with many other actors within the network. There are only a few actors which form small opposing clusters that surround one big cluster in the middle. The gradual removal of links between actors with lower weights, i.e., fewer shared policy preferences, substantiates this impression (see the network graphs in C1 in the Supplementary File). However, we can observe that four of the six containers form a separate cluster, indicating some divergence between containing and expanding actors. Nevertheless, the network indicates a higher degree of consent than conflict. Therefore, we conclude that the discourse network is characterized by a unitary or strongly collaborative structure.

The structure of the policy network is similar. The network consists of one large group of actors in the center of the graph. Within this center, two subgroups exist. Within these subgroups, edge weights are higher, indicating a slightly higher degree of preference similarity (see also the network graphs in B2 in the Supplementary File).



(a) (b)

- Container
- Expander
- Political-administrative
- Third-party

Figure 5. Subtract networks. **(a)** Discourse network, **(b)** Policy network. Notes: Line widths are dependent on edge weight (the more shared policy preferences, the thicker the line between two actors). Actors have been positioned using the Fruchterman-Reingold algorithm.

Much like the discourse network, there are many links between the subgroups, indicating that polarization is not very strong. Regarding actor types, expanding and containing actors do not cluster in separate groups, which further indicates an absence of conflict. Overall, we can conclude that the policy network also reveals a unitary or strongly collaborative structure.

The results of the hierarchical cluster analysis substantiate the conclusions drawn from our first analysis of the network structures. Figure 6 depicts the results as a dendrogram in which similar actors are grouped together as clusters. The height of the branches displays the similarity or dissimilarity of actor groups. The lower the branches connecting two clusters, the more similar they are. The heat map located underneath the dendrogram illustrates each actor's positioning on the policy solutions discussed.

The discourse network is characterized by a larger number of smaller cliques with unique policy preferences, rather than adversarial coalitions. This impression prevails upon closer inspection of the actor groups' shared policy preferences in the heat map. One group of actors on the left mostly agrees on solutions that either address consumers or apply an end-of-pipe approach. In the middle, one group opposes an end-of-pipe approach and another one only favors solutions targeting the industrial or the agricultural sector. There is one larger group on the right which supports solutions addressing consumers and the industrial sector. Finally, there are a few smaller groups with actors which support solutions targeting the industry but differ in their preference towards other solutions.

The policy network consists of two groups of actors, though actors in both of these groups have very similar policy preferences. Most actors support measures in the agricultural and industrial sector and oppose policies that address consumers. The two groups only emerge as distinct from one another due to their divergent positions on the question of whether end-of-pipe measures should be prioritized. While the group on the left opposes the prioritization of end-of-pipe measures, the group on the right remains mostly supportive. Overall, the results of the cluster analysis also indicate a unitary structure.

To summarize, policy and discourse networks reveal similar coalition structures. Both are characterized by a unitary or strongly collaborative structure. Observed differences between networks are rather small.

4.4. Differences in Time

Turning to Expectation 4, we split the discourse network into two periods and analyze whether significant differences in network structures can be observed.

Figure 7 depicts the subtract networks for both periods and the results of community detection (node colors). When looking at clusters, the network in Period 2 (January 2015–March 2017) is less polarized than in period 1 (January 2013–December 2014). The results of community detection also suggest differences in the network structures. The analysis reveals three larger and one very small group in the first period. In the second period, we identify four groups. However, the positions of these groups overlap to a large degree. The higher number of policy preferences shared by members of different groups in the second period indicates that similarity between groups (between-group density) increased compared to in the first period. This further points towards an evolution of network structure over time.

The results of hierarchical cluster analyses and closer inspection of the specific policy preferences substantiate these observations (see the dendrograms and heat maps in Figures E1 and E2 in the Supplementary File) since congruence between the actors increases over time. Actors are less divided concerning measures in the agricultural or industrial sectors in Period 2. Instead, the question of whether end-of-pipe measures should be prioritized is now more prominent in Period 2 and divides some of the actors. In this regard, Period 2 of the discourse network resembles the policy network more closely as divisions on this policy solution coincide with the main line of conflict in the policy network.

To summarize, we can observe some small differences between both observation periods. In fact, the structure of the discourse network in the second period resembles the policy network more closely. Although the differences are not very strong, it is noteworthy that different time periods may lead to different results. These findings suggest that data collection for policy networks at different points in time could most likely also increase the accuracy of results. This especially holds true when analyzing policymaking processes that stretch over a longer period of time.

5. Conclusions

Both policy and discourse network approaches are used to analyze policymaking processes, but there is a lack of empirical studies comparing the similarities and differences in results that these approaches reveal regarding policy change. While policy networks often build on survey data, discourse networks typically employ media data to capture actors' shared policy preferences. In order to make an informed decision on valid data sources, researchers need to understand how differences in data sources may affect results. As this remains largely unexplored, we systematically compared policy and discourse networks by taking the case of water policy in Germany.

In a first set of theoretical expectations, we explored *differences* based on the idea that discourses may represent a more deliberative process, open to marginalized actors and various policy proposals, compared to policy networks. In a second set of expectations, we investigated *similarities*, i.e., whether similar coalition structures of actors with shared policy preferences emerged in both types of networks.

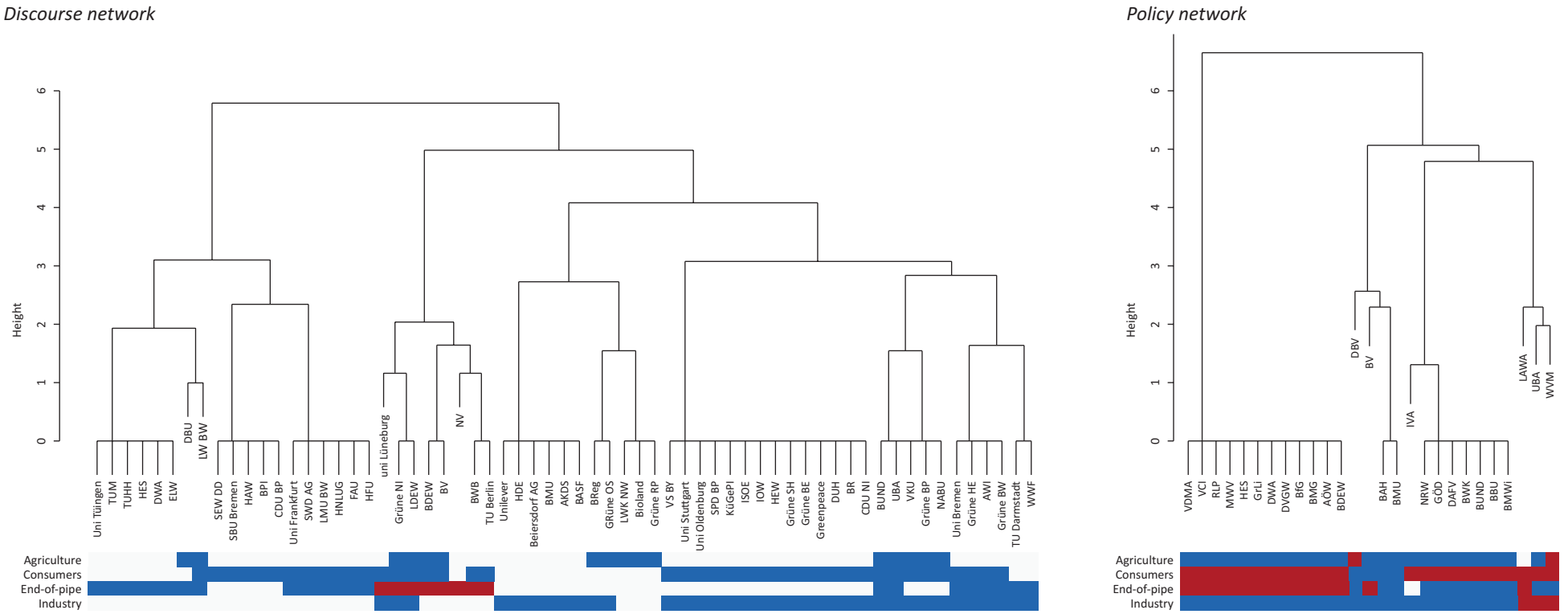


Figure 6. Cluster analysis. Notes: Blue = agreement; red = disagreement; white = no statement. The colors illustrate actor's positioning on the policy solutions equivalent to Figure 4.

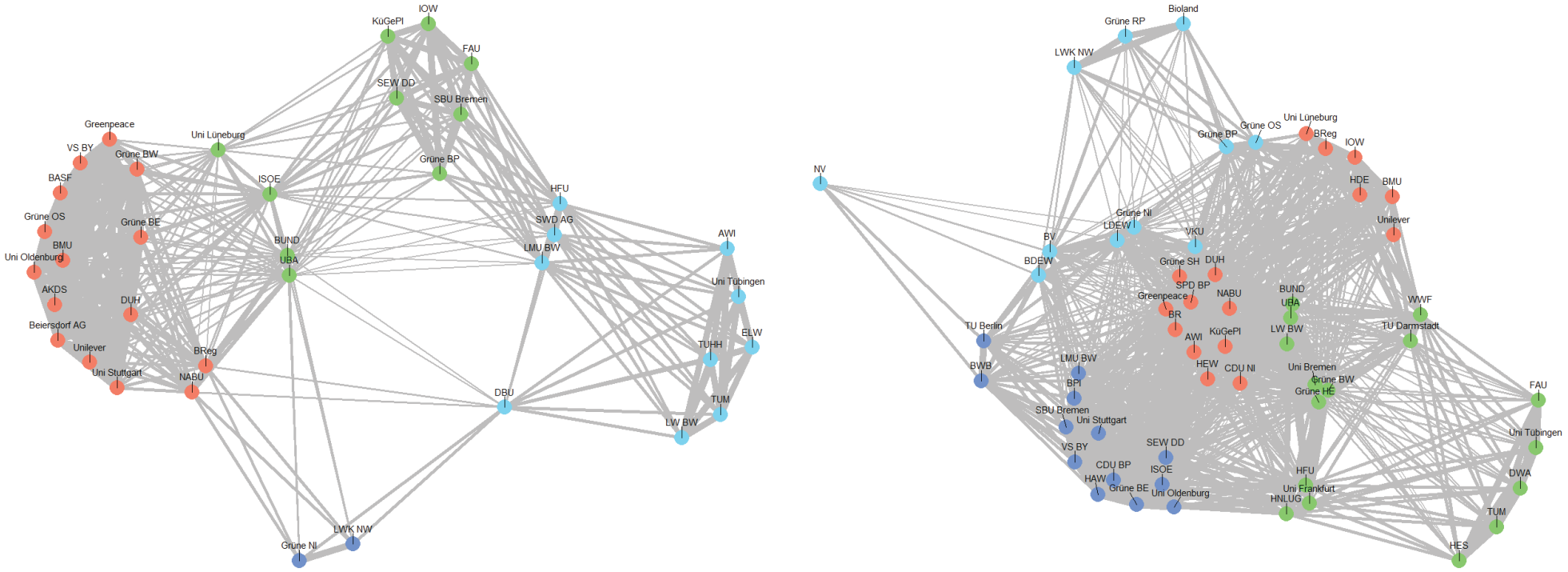


Figure 7. Comparing discourse networks over time. **(a)** January 2013–December 2014, **(b)** January 2015–March 2017. Notes: Node colors refer to different community membership; line width is dependent on edge weight (the more shared policy preferences, the thicker the line between two actors); actors have been positioned using the Fruchterman-Reingold algorithm.

For our case, we find that the different analytic approaches lead to largely similar results, though some differences become manifest as well. First, results from policy and discourse network approaches differ in their emphasis on actor types. Whereas the share of actors with an interest in expanding or containing an issue is equal in the policy network, expanders dominate the discourse network. Results can be interpreted as a specificity of Germany, or corporatist states more generally, where organized interests (e.g., industry) have institutionalized access to policy formulation. Their lack of access to policy formulation may drive expanders to be particularly active in the policy discourse. Results could also be interpreted as specificities of methodological approaches. Studies that employ the discourse network approach could systematically emphasize expanders more than the policy network approach does. Future research is needed that compares expanders' and containers' access to policy venues (discourse/policy formulation) across corporatist and pluralist countries.

Secondly, both network approaches capture a high number of similarities among policy proposals, though some differences become manifest, as expected, when policies target consumers, i.e., voters. Such preferences are less visible in the policy than in the discourse network approach. Results may forewarn future research that policies targeting voters, e.g., demand-sided policies, are sensitive topics and therefore show up more prominently in discourse than in policy network approaches. Such dissimilarities also have implications for the analysis of coalitions. Coalitions are identified based on the shared preferences of actors. However, if actors strategically mask (or emphasize) their preferences depending on the venue (discourse/policy formulation), scholars should carefully evaluate how to integrate preference data into coalition analysis in order to produce results that are congruent across approaches.

Thirdly, the structures of policy and discourse networks are similar. Both networks are characterized by low polarization and a unitary structure. Although the differences in coalition structure are rather small, results indicate that discourse and policy network approaches highlight different games that actors play in discourses and policy formulation. The low share of disagreement statements in the discourse network suggests that actors focus on promoting their preferred policy proposals. In policy formulation, by contrast, actors seem additionally concerned with blocking unpopular proposals. The manner in which data are gathered emphasizes such differences because surveys explicitly ask respondents to indicate which policy proposals they support and reject, while media tends to report on policies that actors support.

Lastly, the structure of the discourse network differs between observation periods. Although the differences are not very strong, it is noteworthy that different time periods affect results. Collecting data for policy networks at different points in time would increase the accuracy of results. As it remains challenging to survey political actors repeatedly, future research is needed which explores innovative data-collection methods that overcome the constraints of survey research (e.g., low participation) but still provide insider information about the policymaking process.

A key insight of our study is that some, albeit small, differences exist between policy and discourse network analyses. The discourse network approach emphasizes expanders, while the policy network approach masks actors' preferences for policies targeting voters. As differences are surprisingly low, our results suggest that both discourse and policy network data can be used to study the policy process and that results should not differ systematically. The conclusions apply to our case, but the generalizability is limited due to several reasons. First, the small-N research design of this study possibly accentuates idiosyncrasies, i.e., characteristics that might be case-specific. For instance, the low level of polarization that the discourse network approach revealed might also stem from the fact that micropollution is a rather technical issue that actors have not yet politicized in the German media. Second, our discourse network analysis includes four concepts, whereas most of the published studies on discourse networks consider a larger number of concepts. The use of a limited number of concepts in our case could be one reason for the low level of polarization that we find within the discourse network. With more concepts, however, the analysis of coalition structures should be more fine-grained. In fact, most published studies on discourse networks find strongly polarized coalitions (Fisher, Waggle, & Leifeld, 2013; Leifeld, 2013; Tosun & Lang, 2016). In order to enhance external validity, future research comparing discourse and policy networks should use a more extensive number of concepts and apply a large-N and comparative research design.

To generate further theory-relevant insights, future research should identify the origin of differences between analytical approaches. Are differences a consequence of data-gathering techniques or an indication that different theoretical mechanisms guide the development of policy debates or policy formulation? To date, only a few comparative network studies exist (exceptions include Metz, 2017; Ylä-Anttila et al., 2018) to which we could compare our results in order to address this question. Ingold et al. (2020) follow a slightly different goal in their comparison of data on policy preferences that were gathered using surveys and coded consultations. They report differences in data on actors' policy preferences across data sources, in particular for policy losers, i.e., actors whose positions were not considered in the final policy decision. They can only speculate where changes come from, e.g., as losers may want to mask their political loss. Their study encounters the same difficulty as we do in identifying the origin of these differences. One possible conclusion is that both survey and media data can only approximate what happens during policy processes.

However, future developments, e.g., e-democracy, could increase the transparency of this and thereby draw a sharper picture of policy change.

Acknowledgments

A special note of thanks goes to Karin Ingold, Jale Tosun and Eva Lieberherr, who supported this study. The authors would like to thank the Swiss National Science Foundation and the Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg for their generous financial support (grant number 105217_140395, "How to explain instrument selection in complex policy processes" and grant number 33–7533 respectively). A previous version of this article was presented at the 2019 ECPR general conference. We thank the conference discussants and panel members for their helpful thoughts on our article. Finally, we thank the editor and anonymous reviewers for their constructive inputs.

Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 200–214
DOI: 10.17645/pag.v8i2.2603

Article

The Science–Policy Interface as a Discourse Network: Finland's Climate Change Policy 2002–2015

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Submitted: 31 October 2019 | Accepted: 29 February 2020 | Published: 2 June 2020

Abstract
In this article, we argue that the science–policy interface can be understood as a discourse network constituted by discursive interaction between scientific organizations and other actors that both use scientific arguments in conjunction with other policy arguments. We use discourse network analysis to investigate the climate change policy process in Finland between 2002 and 2015, focusing on the role of and relationships between scientific actors and arguments in the discourse networks. Our data consist of policy actors' written testimonies on two law proposals, the ratification of the Kyoto Protocol (2002) and the enactment of the Finnish Climate Law (2015). Our results show that two competing discourse coalitions have influenced the development of climate change policy in the 2000s. In 2002, the dominant coalition was economic, prioritizing economic growth over climate change mitigation. In 2015, the climate coalition that argued for ambitious mitigation measures became dominant. The majority of scientific actors were part of the dominant economy coalition in 2002 and part of the dominant ecology coalition in 2015. The centrality of scientific arguments increased over time, and both discourse coalitions used them progressively more. These developments reflect the increasingly central position of science in Finnish climate policymaking. We contribute to the literature on the science–policy interface by operationalizing the interface as a set of connections in a discourse network and by showing how the analysis of discourse networks and their properties can help us understand the shifts in the role of science in policymaking over time.

Keywords
climate change; economy; Finland; public policy; science–policy interface

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

Climate change is a policy sector in which the role of scientific information is particularly salient. The Intergovernmental Panel for Climate Change, established in 1988 to provide policymakers with information about climate change, has produced a tremendous amount of knowledge on the various impacts of anthropogenic climate change. However, there has been a discrepancy between the amount of scientific knowledge and the policy responses to climate change. The reasons for this mismatch are manifold, but one factor is particularly important in climate policymaking: Environmental policies, such as climate policy, are ultimately about reconciliation between different values and interests (Hoffman, 2015; Hulme, 2009; Layzer, 2016). Consequently, climate science cannot dictate policy action nor escape the social world: Policy actors tend to make their own interpretations of scientific knowledge and use it selectively in congruence with their own values and preferences (Pielke, 2002).

The literature on the science–policy interface examines this exact dilemma—that is, the often-complicated

relationship between science and policy. This literature has identified many contextual factors that complicate the functioning of this interface (Bremer & Glavovic, 2013; Dilling & Lemos, 2011; Lacey, Howden, Cvitanovic, & Colvin, 2018; Lahsen, 2009; Pielke, 2010; Runhaar & Nieuwaal, 2010). One of these factors—the politicization of science—is particularly salient for the climate science–policy interface (Brown, 2015; Pielke, 2010; Sarewitz, 2004; Weingart, 1999; Wesselink, Buchanan, Georgiadou, & Turnhout, 2013). By politicization, we refer to the process whereby science becomes part of general value and power struggles in society (Pielke, 2010; Sarewitz, 2004). In keeping with this definition, politicization does not necessarily mean that scientific facts are denied or scientific actors confronted on political grounds, even though such things do take place in climate change politics, particularly in the US (McCright & Dunlap, 2011). Instead, the politicization of science is a wider discursive process whereby policy actors interpret scientific knowledge and assess its policy implications in varied ways, and they use it selectively in public debates to support their own political and ideological goals (Bremer & Glavovic, 2013; Runhaar & Nieuwaal, 2010; Sarewitz, 2004; Weingart, 1999). Scholars have argued that the politicization of science has paradoxically accelerated as the role of science and scientific actors has strengthened in policymaking in recent decades (Pielke, 2002; Weingart, 1999).

This article examines the science–policy interface from a novel perspective, using discourse network analysis (DNA; Leifeld 2019). DNA examines political discourse as a network in which policy actors group into competing discourse coalitions based on shared discourses. Our relational approach offers a novel tool to systematically analyze the science–policy interface. Using DNA, we can zoom in on the role and relationships of scientific actors and arguments in the policy debate by examining questions such as the following: Which discourse coalitions are scientific actors a part of? How central are scientific actors and arguments, compared to other policy actors and arguments, in the policy debate? We argue that by analyzing these relational properties, we can better understand the science–policy interface.

Our empirical case is Finland, where scientific knowledge has enjoyed a relatively strong position in policy processes. According to recent studies, however, science in relation to climate change policy has become politicized in Finland in the 2000s (Hildén, 2011; Kerkkänen, 2010; Leipola, 2018). Our data consist of 86 written testimonies given by policy actors in official consultation processes regarding two key events in Finnish climate policymaking—the ratification of the Kyoto Protocol (2002) and the enactment of the Finnish Climate Law (Finnish Government, 2015).

2. Literature and Research Questions

The literature on the science–policy interface analyzes the relationship between science and policy by examining the configuration of actors that are "involved in the production, mediation, and application of [scientific] information" (Kettle, Trainor, & Loring, 2017, p. 2). Based on the early models, the science–policy interface was conceptualized as a linear process whereby science and policy formed a close partnership in regard to the resolution of political problems (Weingart, 1999). However, this model has since experienced a significant reversal. Some scholars have concluded that the availability of scientific knowledge alone does not guarantee effective or desirable policy outcomes (Lahsen, 2009; Pielke, 2010; Wesselink et al., 2013).

In this literature, many factors that intervene in the interface resulting from the science and policy end have been identified. Intrinsic factors related to the production of scientific information itself can complicate the interface. These factors include the relevance of scientific information to policymakers, the ineffective communication of scientific uncertainty to policymakers and the scientists' inadequate understanding of the decision-making context (Dilling & Lemos, 2011; Runhaar & Nieuwaal, 2010). Contextual factors related to the policymaking environment are also numerous and include institutional and financial barriers, such as having few collaborative structures between scientists and policymakers or having too few resources (Bremer & Glavovic, 2013; Dilling & Lemos, 2011). With regard to climate change policymaking, some scholars have identified numerous crucial factors that influence the functioning of the science–policy interface. For instance, they have looked at how scientific information flows in climate policy networks between the producers and users of scientific knowledge (Kettle et al., 2017; Wagner et al., 2020) and how political and cultural factors, such as political culture and geopolitics, impede the use of scientific knowledge in climate policymaking (Lahsen, 2009). Having too little or too much trust in the climate–science policy interface can also complicate the use of scientific knowledge in policymaking (Lacey et al., 2018).

One strand of this literature examines the politicization of science in discursive processes. Discourse is defined as "an ensemble of ideas, concepts and categories through which meaning is given to phenomenon" (Hajer & Versteeg, 2005, p. 75). Discursive approaches to the science–policy interface note that scientific and technical knowledge is always interpreted in a specific social and political context (Dryzek, 2005; Jasanoff, 2004; Wesselink et al., 2013). Policy actors play a crucial role in how they frame and selectively use scientific results (Jasanoff, 2004; Weingart, 1999; Wesselink et al., 2013). According to these perspectives, science tends to be politicized in discursive processes: Policy actors construct differing, often competing discourses about scientific knowledge and its policy implications based on their different values and interests (Forsyth, 2012; Pielke, 2010; Sarewitz, 2004).This literature also suggests that as science and scientific actors become an important part of the policy process, this simultaneously leads

to the increased politicization of science (Pielke, 2002; Weingart, 1999).

However, previous studies on the politicization of science rarely offer systematic tools to analyze these discursive processes, and when they do, they often downplay the fact that political discourse is a relational phenomenon: Policy discourses involving scientific organizations and actors are formed in the interactions between policy actors. We aim to fill this gap by using DNA, which is a combination of qualitative content analysis and quantitative network analysis (Leifeld, 2017). DNA offers a systematic tool to analyze several properties of the science–policy interface, such as the existence of competing discourse coalitions and the centrality of scientific actors and arguments in discourse networks in relation to other policy actors and arguments. A discourse coalition is a group of political actors in the public sphere whose members share a similar empirical or normative interpretation of a policy issue (Hajer, 1993). Studies argue that discourse coalitions have a significant impact on policy processes by shaping policy priorities and framing policy problems in different ways (Bulkeley, 2000; Hajer, 1993; Kukkonen, Ylä-Anttila, & Broadbent, 2017; Kukkonen et al., 2018; Leifeld & Haunss, 2012; Rennkamp, Haunss, Wongsa, Ortegad, & Casamadrid, 2017). Centrality, in turn, is a network property that demonstrates the importance of a node in the whole network. In our case, it indicates whether scientific actors are central in the climate policy discourse and how widely scientific arguments are used to support other policy arguments.

Discourse network properties such as these have an important impact on policy processes (Leifeld & Haunss, 2012). We argue that analyzing these properties and their changes is useful for understanding the science–policy interface and the shifts in the use of science in policy processes over time. Our research questions are as follows:

RQ1: What kind of discourse coalitions are present in the Finnish climate change policy process between 2002 and 2015, and how central are scientific actors?

RQ2: How central are scientific arguments, and what other types of policy arguments are they used in conjunction with?

3. Case, Data, and Methods

Studies have suggested that in regard to climate policymaking in Finland, science has become a target of political battles in the 2000s (Hildén, 2011; Kerkkänen, 2010; Leipola, 2018). According to these studies, political actors have used scientific knowledge selectively and to advance their own political goals. In 2017, for instance, the Finnish Climate Change Panel published a report in which it warned the government that the plans to increase logging would decrease carbon sinks for decades (Seppälä et al., 2017). However, the report was interpreted in contradictory ways, and the Finnish government even used it to defend additional logging (Leipola, 2018). In general, climate change policymaking has been controversial in Finland. Finnish climate policy has been influenced to a great extent by the heavy industry, whose lobby has been able to hinder effective climate policymaking by framing climate change in an unfavorable way, namely by arguing that climate change mitigation will hurt economic growth and national competitiveness (Hildén, 2011; Kerkkänen, 2010). Finland is economically reliant on the success of its export industry, such as the forest and metal industry, which explains the significant influence of these industries. Research has also shown that the Finnish government has strong collaborative ties to the heavy industry in regard to climate policymaking and few ties to NGOs and research organizations (Gronow & Ylä-Anttila, 2019; Gronow, Ylä-Anttila, Carson, & Edling, 2019; Teräväinen, 2010).

In this article, we examine the role of science in Finnish climate change policymaking between 2002 and 2015, which is a key period in the formation of Finnish climate policy. Based on the literature reviewed above, we expect to find that the role of science in climate change policy discourse has become increasingly central over the course of these years.

Our data consist of 86 written testimonies given by policy actors from different sectors regarding two law proposals: the ratification of the Kyoto Protocol in 2002 and the enactment of the Finnish Climate Law in 2015. We chose to analyze these two events because they constitute major landmarks in Finnish climate change legislation. Both law proposals have undergone an official consultation process, providing us with testimonies from policy actors and thereby enabling us to investigate the role of scientific actors and arguments over time.

Finland ratified the Kyoto Protocol in 2002. Finland's obligation under the protocol was to keep its greenhouse gas emissions at the 1990 level. As part of the EU's climate change legislation, Finland has been obliged, for instance, to join the EU's Emissions Trading System, reduce greenhouse gas emissions in non-Emissions Trading System sectors according to the EU's joint burden-sharing agreement, and increase the share of renewable energy in its energy production).

The Finnish Climate Law came into force in June 2015. It is a framework law that sets up a system to plan, coordinate, and track Finnish climate change policymaking in non-Emissions Trading System sectors. The Finnish Climate Law does not include any substantive legislation for different policy sectors, businesses, or citizens, but it includes a binding long-term emission target for Finland—that is, an 80% reduction by 2050, compared to the 1990 emission levels. The law strengthens the role of the Finnish Parliament, enhances different stakeholders' participation in Finnish climate policymaking, and establishes and identifies the role of the Finnish Climate Change Panel as an advisory body to the government in climate policymaking. The Finnish Climate Law changed the division of labor between the different ministries

to some extent. The Ministry for Economic Affairs and Employment is still responsible for the implementation of EU's climate change legislation in Finland, which has been carried out via national climate and energy strategies since 2001. The Ministry of Environment is responsible for the coordination of UN and EU climate negotiations, as well as sectors such as land use, waste management, and construction. Along with the Finnish Climate Law, the Ministry of Environment's mandate for climate and energy policy was expanded to include the responsibility for coordinating the medium-term climate policy plan. The Ministry for Agriculture and Forestry remains responsible for issues related to the use of forests.

During the official consultation procedures linked to most major legislative processes in Finland, the responsible ministry sends requests for a written testimony to a group of policy actors that represent the most important stakeholders in Finnish climate change policy. These include business and trade organizations, NGOs, and scientific organizations. Table 1 lists the organizational affiliations of the policy actors that gave written testimonies in 2002 and 2015.

The testimony is a free-form text in which the policy actor expresses support for or opposition to the law proposal at hand and justifies its position. These testimonies are publicly available from the government's electronic archives (Finnish Government, 2019). The responsible ministry collects the testimonies and considers them when preparing the law. In the case of the Kyoto Protocol, we have no information on how many requests for testimony were sent, but 30 policy actors delivered written testimonies. In the case of the Finnish Climate Law, 81 policy actors were contacted and 69 delivered written testimonies. In their testimonies, some policy actors merely stated that they had no comments or they expressed support for the law proposal without justifying their position. These testimonies are excluded from the final data set because they do not include any policy arguments for analysis. The final data set includes 22 testimonies from 2002 and 64 from 2015. The Supplementary File includes the list of policy actors that delivered testimonies.

Using the DNA software (Leifeld, 2019), we coded all the policy statements that were included in the testimonies. These statements represent general arguments that policy actors use to defend or oppose/raise concerns over the law proposal. The arguments could deal with causes, definitions, or solutions related to the law proposal at hand. We distinguished between general policy arguments and scientific arguments. Scientific arguments differ from other policy arguments in that they draw on scientific research or refer to scientific actors.

We assigned the statements to different argument categories, which were formed inductively during the coding process. For each statement, we coded four attributes: name of the person, name of the organization, the argument category referred to by the organization (called 'concept' in the DNA context), and agreement or disagreement with the argument category. One testimony could include multiple statements.

For example, the following statement belongs to the argument category 'climate science supports the enactment of the Finnish Climate Law':

> Scientific evidence on anthropogenic climate change is strong. The assessments of the impacts of climate change on people, societies, and the environment at different time scales have been done based on the existing scientific knowledge. To avoid the uncontrolled consequences of climate change, actions to reduce GHG [greenhouse gas] emissions are really needed. Enacting the Finnish Climate Law is one way of systematizing the matter. (Ministry of Transport and Communications, 2014)

This is classified as a scientific argument. The following statement, which belongs to the argument category 'Climate Law could weaken economic growth and national competitiveness,' is an example of a nonscientific policy argument: "Well managed commercial forests store carbon most effectively. The Finnish Climate Law could restrict this type of rational action…and lead to unnecessary restrictions for the forest industry" (Forest Owners' Association of Finland, 2014).

Table 1. Organizational affiliations of policy actors giving written testimonies in 2002 and 2015.

	Ratification of the Kyoto Protocol (2002)		Enactment of the Finnish Climate Law (2015)	
	N	%	N	%
Business and trade organization	10	45	19	30
Government	5	23	10	16
Environmental NGO	3	14	7	11
Scientific organization	4	18	11	17
NGO	0	0	9	14
Municipal government	0	0	4	6
Business	0	0	3	5
Other	0	0	1	1
Total	22	100	64	100

Table 2. The final dataset.

	Policy actors	Statements	Concepts (argument categories)
Kyoto Protocol (2002)	22	119	28
Finnish Climate Law (2015)	64	342	29

The coding procedure resulted in 28 argument categories in the case of the Kyoto Protocol and 29 in the case of the Finnish Climate Law (Table 2). However, when exporting the data to the social network analysis software, we included only the most common argument categories (Kyoto ratification: more than three mentions by actors; Climate Law: more than six mentions by actors). This resulted in 17 argument categories in the case of the Kyoto Protocol and 15 in the case of the Finnish Climate Law. The selected argument categories represent 85% of all statements in both cases (for a full list of the argument categories, see the Supplementary File). Tables 3 and 4 list the argument categories and their abbreviations (used in the figures in the results section) for our two data time points, 2002 and 2015.

After coding, we created one-mode co-occurrence networks of policy actors and argument categories using the DNA software. In our case, the co-occurrence of actors and arguments is based on congruence. This means that policy actors share a tie in the discourse net-

Table 3. Argument categories and abbreviations during the ratification of the Kyoto Protocol (2002).

Kyoto Protocol (2002)			
Argument category	Agree/disagree (N)	N	Shortened form
Kyoto Protocol could weaken economic growth and national competitiveness	13/0	13	Economic growth and national competitiveness
Finland should use nuclear energy to reduce GHG emissions	9/2	11	Nuclear energy
Energy efficiency is essential in the reduction of GHGs	8/0	8	Energy efficiency
Finland's emission targets should not be tightened	7/0	7	Emission targets not tightened
Kyoto Protocol promotes the use of renewable energy	6/1	7	Renewable energy
Kyoto Protocol should include large emitters	6/0	6	Large emitters
Climate science supports the ratification of the Kyoto Protocol	6/0	6	**Climate science**
Finland should invest in Research & Development to reduce GHG emissions	6/0	6	**Research and development**
Finnish industry's emissions are as low as possible	5/0	5	Finnish industry has low emissions
The Emissions Trading System is problematic	4/0	4	Emissions Trading System is problematic
Kyoto Protocol creates economic growth	4/0	4	Economic growth
Economic studies support the ratification of the Kyoto Protocol	4/0	4	**Economic studies**
Finland should use the Kyoto mechanisms to reduce GHG emissions	4/0	4	Kyoto mechanisms
Finland should be able to decide independently how it will reduce its GHG emissions	4/0	4	National decision-making
More studies on the economic impacts of the Kyoto Protocol are needed	4/0	4	**Studies on economic impacts**
The law proposal's calculations are incorrect	4/0	4	**Incorrect calculations**
Finland should not ban coal-condensing plants	4/0	4	Coal-condensing plants not banned

Note: Scientific arguments are marked in bold.

Table 4. Argument categories and abbreviations during the enactment of the Finnish Climate Law (2015).

Finnish Climate Law (2005)			
Argument category	Agree/Disagree (%)	N	Abbreviation
Climate Law should include a long-term emission target	23/18	41	Long-term emission target
Climate science supports the enactment of the Finnish Climate Law	27/2	29	**Climate science**
Climate Law improves the coordination and planning of Finnish climate policymaking	24/0	24	Coordination and planning
Climate Law strengthens transparency and participation in Finnish climate policymaking	23/1	24	Transparency and participation
Climate Law could weaken economic growth and national competitiveness	23/0	23	Economic growth and national competitiveness
Finnish Climate Change Panel should have legal status	16/4	20	**Legal status of the climate change panel**
Energy policy should be the focus of climate policy	19/1	20	Energy policy
Climate Law is unnecessary and overlaps with current legislation	19/0	19	Law Is unnecessary
Climate Law burdens the administration	19/0	19	Administrative burden
Emissions Trading System should be included in the long-term emission target	13/4	17	Inclusion of Emissions Trading System
More studies on the economic impacts of the Finnish Climate Law are needed	14/0	14	**Studies on economic impacts**
Climate Law creates economic growth	13/0	13	Economic growth
Climate Law improves the image of Finnish climate policy	11/0	11	Image of Finnish climate policy
Social scientific studies support the enactment of the Finnish Climate Law	8/0	8	**Social scientific studies**
Finnish Climate Change Panel should include representation from different scientific fields	7/0	7	**Scientific representation of the climate change panel**

Note: Scientific arguments are marked in bold.

work if they both agree or both disagree with an argument. Argument categories share a tie if a same policy actor uses these two argument categories in a testimony, agreeing or disagreeing with both categories. Edge weights are often normalized to better identify coalitions from media discourse networks in which there is a significant degree of conflict present and the actors' levels of activity differ (Leifeld, 2017). Our data, in contrast, consist of written testimonies in which policy actors usually express their perspectives without criticizing others, and each actor gives only one testimony, resulting in a network with few conflict ties. Consequently, we did not normalize edge weights. Additionally, we did not use threshold values due to the relatively small size of the data.

Using the Gephi software package, we analyzed the positions and relationships of scientific organizations and scientific arguments in the discourse networks. We used two techniques of social network analysis: the Louvain clustering algorithm and the measuring of closeness centrality. First, we used the Louvain algorithm to divide the network into communities. The algorithm counts a modularity score with a value of between −1 and 1, which measures the density of the links inside communities compared to the links between them (Blondel, Guillaume, Lambiotte, & Lefebvre, 2008). Clustering the actor networks allowed us outline the competing discourse coalitions and to determine which coalitions the scientific organizations are a part of. Clustering the argument network, in turn, made it possible to examine which types of arguments are grouped together—that is, used by the same actors in their testimonies. This indicated what type of policy arguments scientific arguments are most strongly connected to.

Second, we used closeness centrality to analyze the network position of the policy actors and arguments. We chose this measure because it takes into account how central a node is in the whole network, calculating the average number of steps that must be taken for a node

to reach all the other nodes in the network (Freeman, 1979). To control for the size of the network, closeness scores were normalized so that their values lie between zero and one. The closeness centrality score indicates how central the actor/argument is in the whole network across its subgroups. Bearing the limitations of the research design in mind, an actor or argument with a high centrality score can be interpreted as having an important role in the policy discourse (for alternative methods of analyzing the position of different actors and arguments in a discourse network, see, e.g., Buckton, Fergie, Leifeld, & Hilton, 2019; Fisher, Waggle, & Leifeld, 2013).

4. Results

In this section, we present and analyze four network diagrams that illustrate the position and relationships of scientific organizations and arguments in the discourse networks—first in 2002 and then in 2015. The closeness centrality of an actor/argument is reported as a number in parentheses after the name of each actor/argument.

Figure 1 illustrates the actor network during the ratification of the Kyoto Protocol in 2002. We identified two competing discourse coalitions in the network using modularity. Based on their arguments (Figure 2), we refer to them as the economy coalition and the climate coalition. The economy coalition is dominant: It includes 14 actors while the climate coalition has 8. It also includes the majority of the most central actors in the network.

Among the most central actors in the network are two scientific actors, and they belong to the dominant economy coalition. These are the VTT Technical Research Center of Finland (0.95) and the VATT Institute

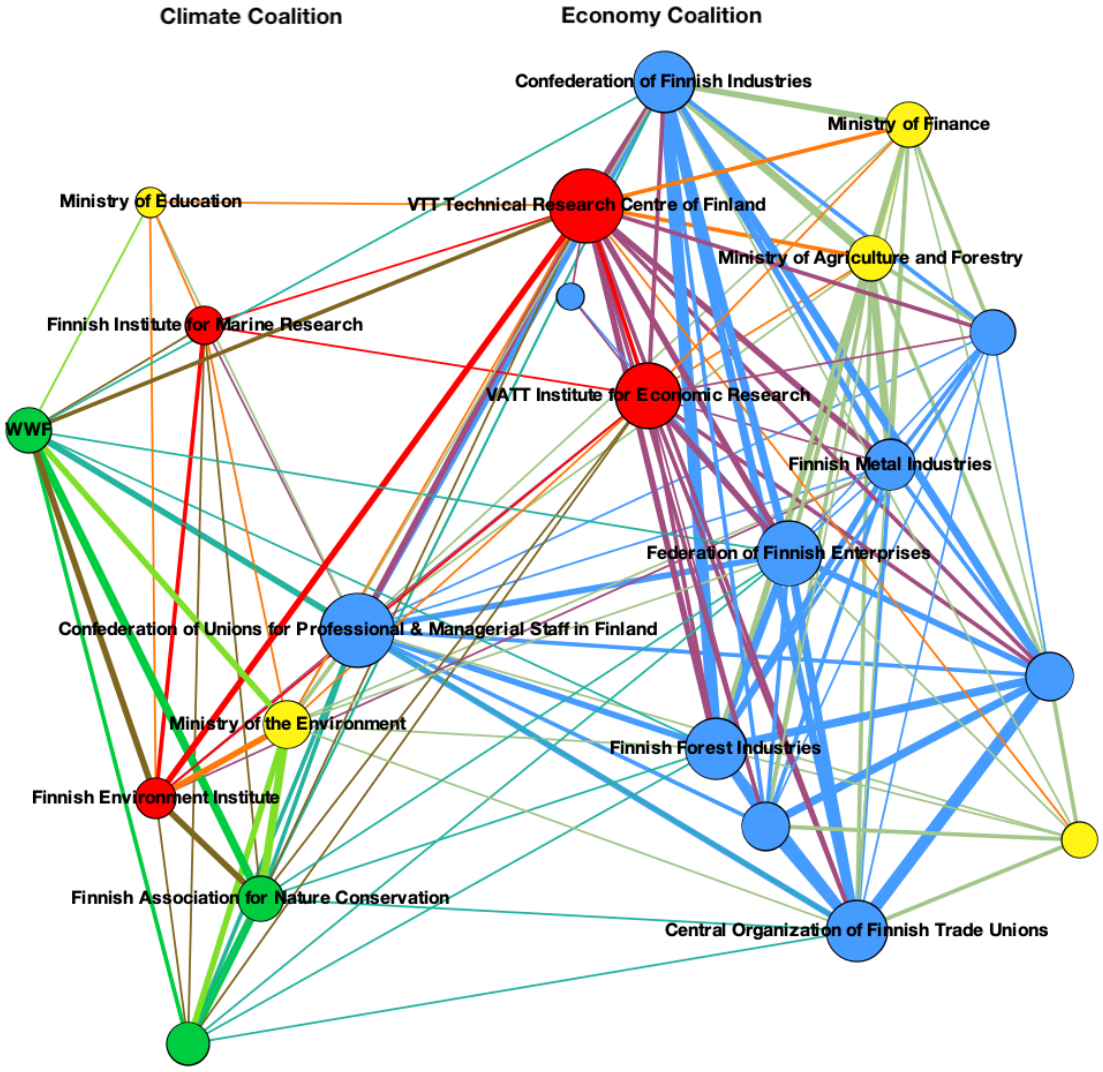

Figure 1. One-mode network of actors via argument categories during the ratification of the Kyoto Protocol (2002). Notes: Node size adjusted based on closeness centrality; ties based and weighted according to congruence. Modularity: 0.203. Red: scientific organization; blue: business organization/trade union; yellow: government; green: environmental NGO; brown: NGO; orange: municipal organization; purple: business; pink: others. Selected actors are labeled to ensure readability of the figure. The color of each edge is the average of the colors of the two nodes that the edge connects.

for Economic Research (0.88). These scientific actors are sectoral research institutes that have an established role in Finnish legislative processes, providing background reports and calculations for the government. Based on agreement, they are allied with business and trade organizations, such as the Confederation of Finnish Industries (0.84), Finnish Forest Industries (0.84), and the Central Organization of Finnish Trade Unions (0.84). Earlier research has demonstrated that these organizations are among the most powerful in regard to climate change policy processes in Finland (Gronow & Ylä-Anttila, 2019; Gronow et al., 2019). The economy coalition also includes ministries, such as the Ministry of Finance (0.7) and the Ministry of Agriculture and Forestry (0.7).

Scientific actors are also represented in the competing, less dominant climate coalition, but they are not as central as the scientific actors in the economy coalition. The scientific actors in the climate coalition are the two environmental research institutes, the Finnish Environment Institute (0.66) and the Finnish Institute for Marine Research (0.64). These scientific actors form the climate coalition together with organizations such as the Ministry of Environment (0.72), the Ministry of Education (0.57), and the Confederation of Unions for Professional and Managerial Staff (0.95), as well as environmental NGOs such as the Finnish Association for Nature Conservation (0.7) and the World Wildlife Foundation Finland (0.7). These organizations play a less powerful role in Finnish climate change policymaking than the organizations belonging to the economy coalition (Gronow & Ylä-Anttila, 2019; Gronow et al., 2019).

Figure 2 shows what types of arguments are central in the network and how their use is divided between the two coalitions. Scientific arguments (red nodes) are not

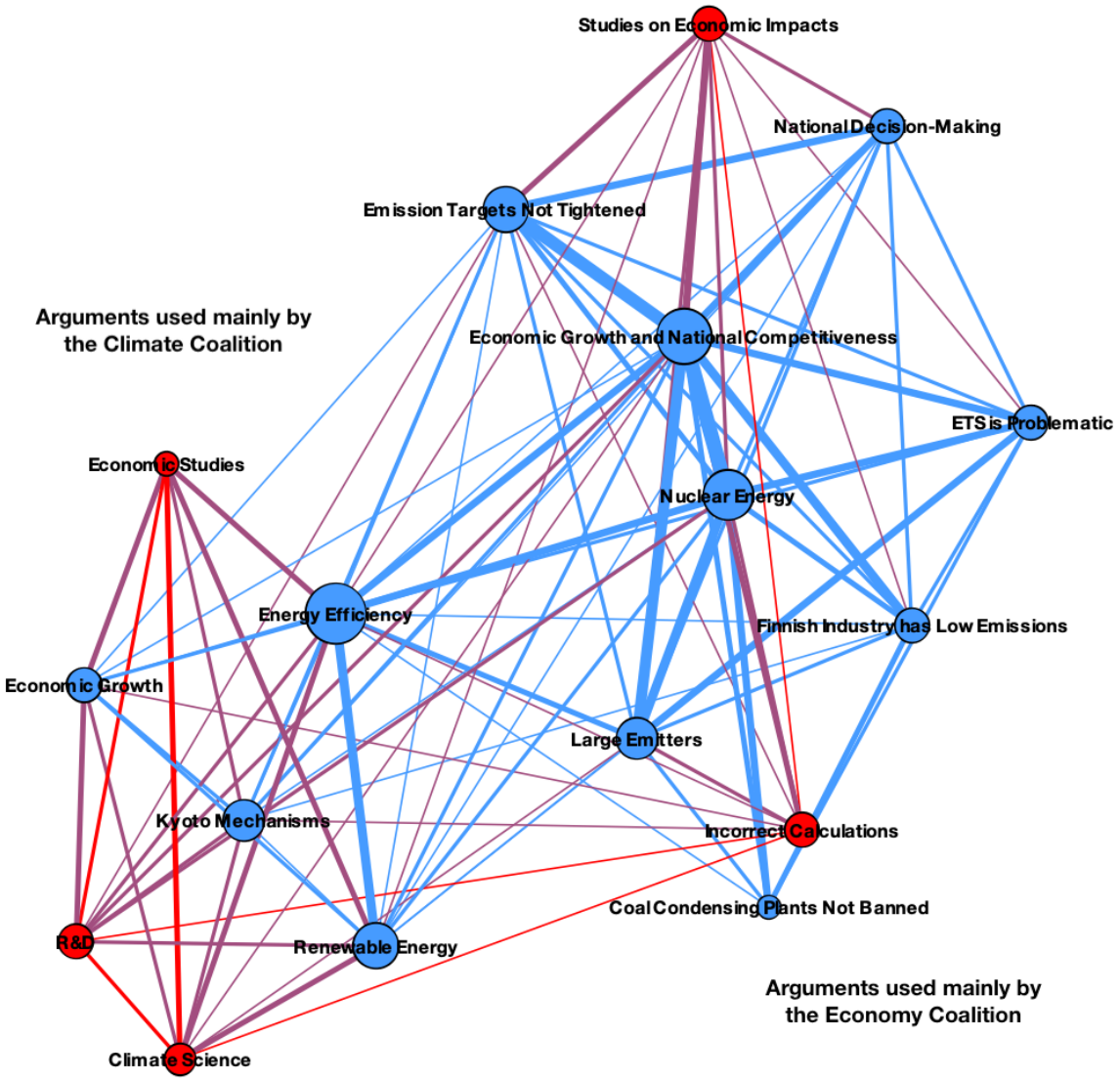

Figure 2. One-mode network of arguments via actors during the ratification of the Kyoto Protocol (2002). Notes: Node size adjusted based on closeness centrality; ties based and weighted according to congruence. Modularity: 0.225. Red: scientific argument; blue: other policy argument. The color of each edge is the average of the colors of the two nodes that the edge connects.

central in the network. Policy actors mainly use policy arguments other than scientific arguments to defend the Kyoto Protocol (climate coalition) or raise doubts about its implementation in Finland (economy coalition). The most central arguments of the economy coalition are that the Kyoto Protocol could weaken economic growth and national competitiveness (0.94), that the required reduction of GHG emissions can only be achieved by increasing the use of nuclear energy (0.89), and that the protocol should include the largest emitters, such as the US and developing countries (0.8).

The economy coalition uses two types of scientific arguments; however, as noted earlier, they do not have a central position in the network. First, the economy coalition argues that more studies are needed on the economic impacts of the Kyoto Protocol (0.73), fearing that the protocol could induce unbearable costs for businesses and consumers. Second, the coalition argues that the law proposal includes incorrect or unclear calculations about Finland's emission targets and demands that these calculations be corrected (0.73).

The most central argument in the network is that the Kyoto Protocol will support plans to increase energy efficiency (1.0). The climate coalition uses this argument more than the economy coalition. The climate coalition's other central arguments are that the protocol will speed up Finland's shift to renewable energy (0.84) and, contradicting the economy coalition's argument, that it will support economic growth, especially in the long run (0.73). Three types of scientific arguments are used to back up the other policy arguments, but again, they occupy a less central position than the other policy arguments. First, the climate coalition argues that the protocol will increase funding for research and development to reduce GHG emissions (0.73). Second, the climate coalition draws on climate science and evidence on the anthropogenic nature of climate change to support the protocol. Third, it argues that current economic studies, such as the impact assessments of the policy options included in the law proposal, support the implementation of the protocol (0.62).

Figure 3 illustrates the actor network during the enactment of the Finnish Climate Law in 2015. Compared to 2002, the number of actors giving testimonies increased significantly, from 22 to 64. In addition, while two competing discourse coalitions remain in the discourse network, the coalitions are now more evenly sized. The climate coalition includes 33 actors and is now bigger than the economy coalition, which has 31 actors.

Whereas in 2002, the two most central actors were scientific, all scientific actors are now moderately central. Specific ministries, business organizations, and trade unions are now the most central actors, reflecting a more widespread involvement of organizations from different sectors. In addition, the scientific actors have now shifted from the economy coalition to the climate coalition, sharing more arguments with the latter than with the former. The climate coalition comprises nine scientific actors. The VTT Technical Research Center (0.72) and the VATT Institute for Economic Research (0.77), the two research institutes that belonged to the economy coalition in 2002, have changed sides and now belong to the climate coalition. Other scientific actors in the climate coalition include the Finnish Climate Change Panel (0.82) and the Finnish Institute for Health and Welfare (0.75). The scientific actors are aligned with ministries, including the Ministry of Transport and Communications (0.9); the Prime Minister's Office (0.78); and some business-initiated organizations, such as the Finnish Bioenergy Association (0.83) and the Solid Waste Association (0.86). The climate coalition now also includes a large number of environmental and other NGOs, such as the Finnish Association for Nature Conservation (0.82) and the development NGO Kepa (0.76). Overall, the scientific organizations of the environment coalition now have a broader and more powerful set of allies in the climate coalition than they did in 2002 (cf. Gronow & Ylä-Anttila, 2019; Gronow et al., 2019).

The economy coalition comprises only two scientific organizations, which are not central: the Forest Research Institute (0.65) and MTT Agrifood Research Finland. These sectoral research institutes are aligned with business organizations and trade unions, of which 16 belong to the economy coalition. These include the Central Organization of Finnish Trade Unions (0.91), the Union for Agricultural Producers and Forest Owners (0.76), and the Forest Owners' Association of Finland (0.79). The coalition also includes ministries, such as the Ministry for Economy and Employment (0.93), which is the most central actor in the network; the Ministry of Agriculture and Forestry (0.74); and the Ministry of Finance (0.74). In addition, the economy coalition includes one denialist organization, a small NGO called the Climate Forum (0.68).

While the centrality of scientific arguments was relatively low in 2002, in 2015, they were among the most central arguments in the discourse network (Figure 4). The climate coalition uses three types of scientific arguments to support the Finnish Climate Law. First, it appeals to climate science (0.93), arguing that climate change legislation should be based on the latest scientific evidence on climate change. Second, the climate coalition supports giving the Finnish Climate Change Panel a legal status (0.88), arguing that this will strengthen the role of scientific knowledge in Finnish climate policymaking. Third, actors in the climate coalition appeal to recent social scientific studies that point to the need to enact the Finnish Climate Law (0.82). These studies include scientific reports that have been based on the social, political, and economic aspects of climate policy. These reports speak to the benefits of implementing the Finnish Climate Law.

The climate coalition uses these scientific arguments to back up other policy arguments. The most central of these other arguments is that the law will improve transparency and participation in Finnish climate policymaking (1.0). The law increases different stakehold-

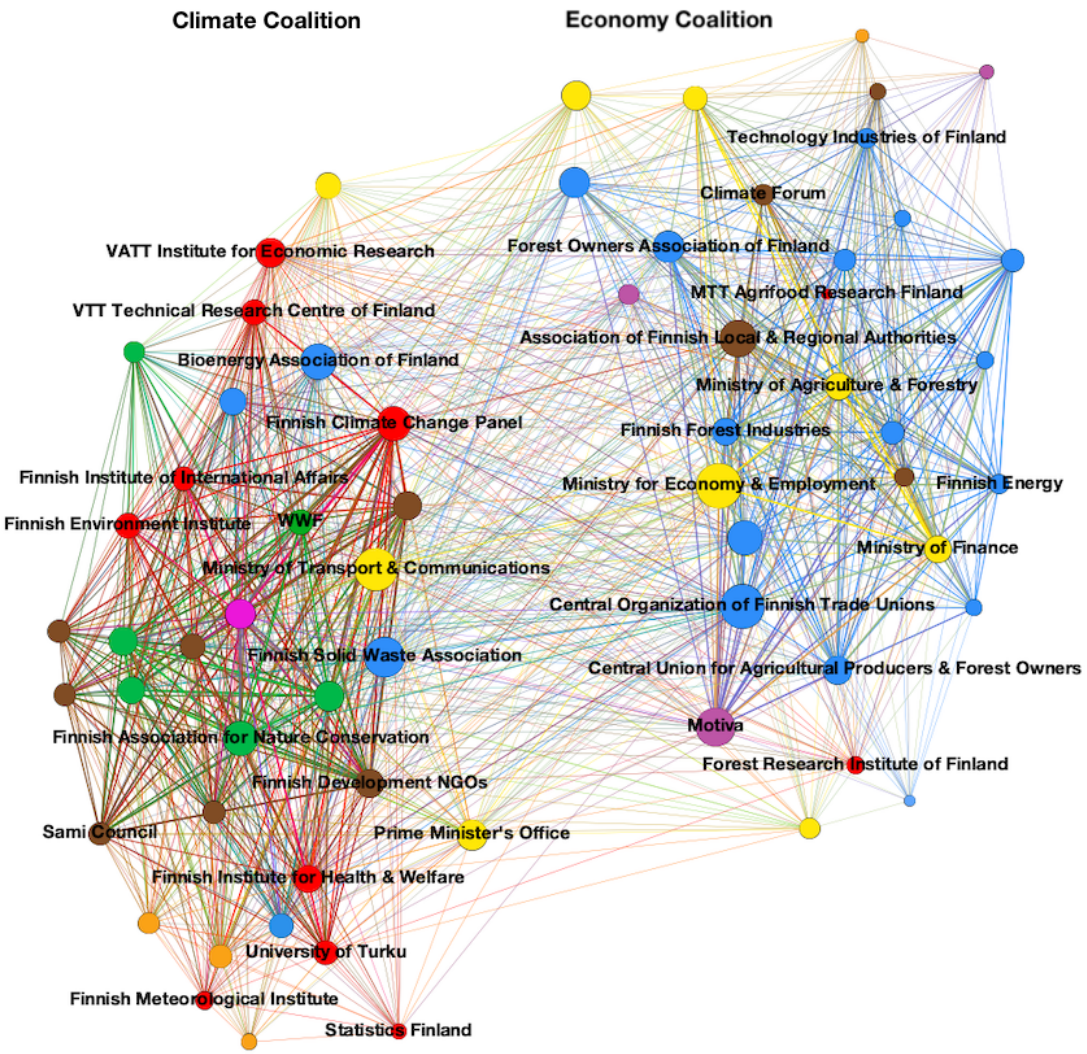

Figure 3. One-mode network of actors via argument categories during the enactment of the Finnish Climate Law (2015). Notes: Node size adjusted based on closeness centrality; ties based and weighted based according to congruence. Modularity: 0.334. Red: scientific organization; blue: business organization/trade union; yellow: government; green: environmental NGO; brown: NGO; orange: municipal organization; purple: business; pink: others. Selected actors are labeled to ensure readability of the figure. The color of each edge is the average of the colors of the two nodes that the edge connects.

ers' possibilities to participate in the climate change policy process, and the climate coalition demands that the background reports and calculations of law proposals and strategies be made public in the future. The climate coalition supports the inclusion of the Emissions Trading System sector in the long-term emission target (0.93) and argues that enacting the Finnish Climate Law will increase economic growth (0.88) by facilitating companies' efforts to make low carbon investments.

The economy coalition opposes the enactment of the Finnish Climate Law. Scientific arguments are also central in the argumentation of this coalition, and there are two types. First, the economy coalition stresses that more studies should be conducted on the economic impacts of the Finnish Climate Law (0.93), as the law could worsen the cost-efficiency of climate policy. Second, the coalition states that the Finnish Climate Change Panel should include wide representation from different research fields (0.67). The coalition emphasizes that the panel should take the business perspective into account in its policy recommendations and should, thus, include representatives from economics and technology studies. The economy coalition uses these scientific arguments in conjunction with other policy arguments that refer to the cost of climate policymaking. As in the case of the Kyoto Protocol, the coalition argues that the law could weaken economic growth and national competitiveness (0.88) and would burden the administration (0.88), which is in contradiction to the plans to streamline the Finnish administration. The coalition also opines that climate policy should mainly be about energy policy (0.88). In Finland, climate policy has traditionally been closely connected to energy policy, as the national climate and energy strategies demonstrate.

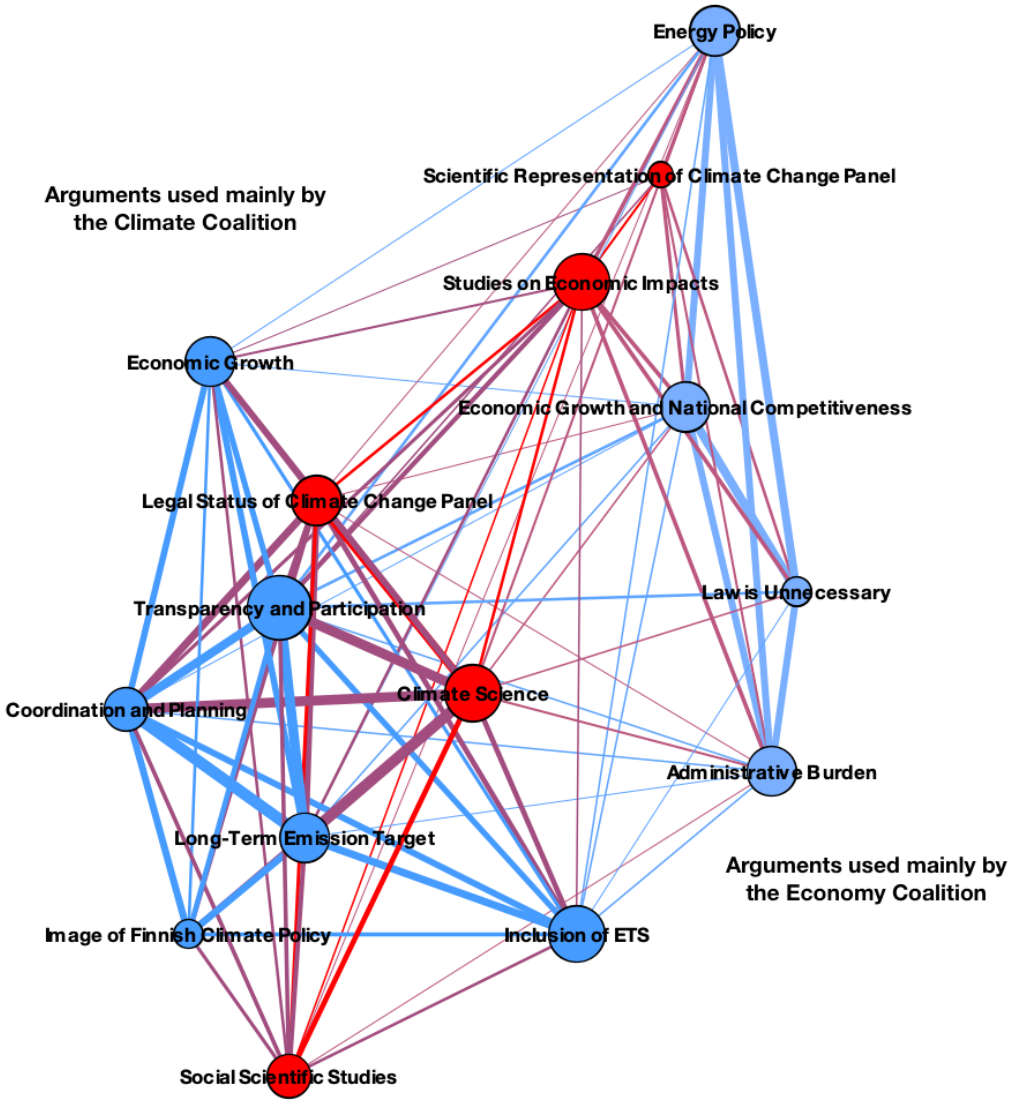

Figure 4. One-mode network of arguments via actors during the enactment of the Finnish Climate Law (2015). Notes: Node size adjusted according to closeness centrality; ties based and weighted according to congruence. Modularity: 0.304. Red: scientific argument; blue: other policy argument. The color of each edge is the average of the colors of the two nodes that the edge connects.

5. Discussion and Conclusion

This article used DNA (Leifeld, 2019) to examine the science–policy interface as a discourse network, focusing on the position of scientific organizations and arguments in the networks.

Our results show, first, that from 2002 to 2015, the Finnish climate change policy process was influenced by two competing discourse coalitions—the economy and climate coalitions. Regarding the role of scientific organizations, we show that they are relatively central throughout the years but that their place in the coalition structure changes. In 2002, the most central scientific organizations were part of the dominant economy coalition and allied with powerful industry interest organizations, ministries, and trade unions. These scientific organizations were research institutes focused on the economy and technology. The environmental research organizations, in turn, were less central and belonged to the weaker climate coalition. By 2015, almost all scientific organizations, including those that had belonged to the economy coalition, shifted to the now dominant climate coalition and, allied with a large number of NGOs and governmental organizations, now support ambitious climate change legislation.

Second, regarding the role of scientific arguments, we show that their centrality in the policy debate increases over time. In 2002, scientific arguments were relatively peripheral. The then-dominant economy coalition's main arguments were that the ratification of the Kyoto Protocol could weaken national economic competitiveness and that the emission reduction target could be

achieved only by increasing nuclear power. These positions were supported by two scientific arguments, as the coalition demanded more studies on economic impacts and argued that the calculations determining Finland's commitments were unclear and should be revised. The smaller climate coalition appealed to climate science in supporting the Kyoto Protocol.

In 2015, scientific arguments were much more central to the debate, and both coalitions used them more than in 2002. Each coalition used the types of scientific arguments that resonated with their values and political goals. The climate coalition that had become dominant argued that the knowledge produced by climate science and the social sciences supports the enactment of the Finnish Climate Law, and it demanded a legal mandate for the scientific Climate Change Panel as an advisory body monitoring the new law. The climate coalition used these scientific arguments to back up its main claims—that is, that the law should include a binding emissions target, including the Emissions Trading System sector, and that it would be beneficial for the economic growth and transparency of, as well as participation in, climate policy. The now weaker economy coalition argued for the need for more studies on the economic impacts of the law and demanded that if the scientific Climate Change Panel is given legal status, it should include not only climate scientists but also economists. These science arguments were used to support the coalition's main claims that the law would be harmful to national economic competitiveness and would constitute an unnecessary administrative burden.

This increase in the centrality of scientific arguments and their use by both coalitions to support their respective political goals reflects a phenomenon that earlier research has called the politicization of science—that is, science becoming fuel for more general value struggles (Brown, 2015; Pielke, 2010; Weingart, 1999; Wesselink et al., 2013). It is not the case, however, that climate science itself would be denied for political reasons by those opposing stronger climate action. Rather, while the proponents of the Finnish Climate Law use climate science to back up their arguments, the opponents' main argument is that economic sciences should also be considered and the economic impacts of the legislation more thoroughly analyzed.

Our main contribution to the literature on the science–policy interface has been to show that it can be fruitful to analyze this interface as a discourse network constituted by discursive interaction between scientific organizations and other actors that both use scientific arguments in conjunction with other policy arguments.

This relational approach has enabled us to go beyond standard techniques, such as quantitative (e.g., counting the appearances of scientific organizations and arguments) and qualitative content analysis of policy testimonies. First, our DNA approach has highlighted the relationship between scientific actors and others, showing that scientific organizations take part in policy processes as part of discourse coalitions. These coalitions and the role of scientific organizations within them can change over time, as evidenced by the gradual shift of the influential economic research institutes from the economy coalition to the climate coalition. The voices of scientific organizations can also be amplified by the other organizations that belong to the same discourse coalition, as evidenced by the marked increase over time in the number of NGOs using scientific arguments to defend ambitious climate change policy.

Second, the relational approach has highlighted the relationships between scientific and other policy arguments, as well as the changes in these relationships over time. Scientific arguments were auxiliary to other policy arguments, such as those defending economic growth and nuclear energy in 2002, whereas in 2015, they had become central in the debate, used in conjunction with arguments such as those demanding long-term emission targets, as well as transparency of and increased participation in climate change policymaking and implementation.

Our results are, broadly speaking, in line with previous research findings on the role of organizational coalitions in climate change politics in Finland, even though these studies used different materials (surveys, media) and did not focus on the role of science specifically (Gronow, Wagner, & Ylä-Anttila, 2019; Gronow & Ylä-Anttila, 2019; Teräväinen, 2010). There is, however, one interesting difference between our results and those obtained earlier, and observing this difference leads to a conclusion that may be of general interest to the increasing number of scholars using DNA to identify advocacy coalitions. Compared to the studies using media material, we found the economy coalition to be larger and stronger. Economic counterarguments to climate change mitigation are often relatively invisible in the media (Lester & Hutchins, 2012). Studies have suggested that their visibility has decreased over time (Ylä-Anttila et al., 2018); however, they figure prominently in our material on parliamentary consultations. Those economically minded actors that are active in the climate change policy domain use strategies such as participating in consultations but do not seek media attention for their arguments (Vesa, Gronow, & Ylä-Anttila, 2020). This shows that the numerous DNA studies using media material (e.g., Buckton et al., 2019; Leifeld & Haunss, 2012; Stoddart & Tindall, 2015) may underestimate the strength of some coalitions because these coalitions use strategies other than speaking to the media. Moreover, DNA studies of congressional hearings on climate change in the US suggest that polarization in the context of a policy debate occurs over the economic implications of climate change and policy measures such as the Clean Power Plan, rather than over climate science (Fisher & Leifeld, 2019; Fisher et al., 2013), even though in the US media, climate science denial is an important strategy of the highly visible climate countermovement (McCright & Dunlap, 2011). This points to a need to tri-

angulate results based on media analysis using other, preferably primary materials, such as the consultation documents used in this article.

Acknowledgments

We would like to thank Ted Chen, Antti Gronow, Aasa Karimo, Paul Wagner, Juho Vesa, the three anonymous reviewers and the Academic Editor of this thematic issue, Philip Leifeld, for their helpful comments on earlier versions of this article. This research was supported by the Kone Foundation (Grant No. 201805496) and the Academy of Finland (Grant No. 320780).

Conflict of Interests

The authors declare no conflict of interests.

Supplementary Files

Supplementary material for this article is available online in the format provided by the authors (unedited).

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Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 215–228
DOI: 10.17645/pag.v8i2.2577

Article

The Political Debate on Climate Change in Italy: A Discourse Network Analysis

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Submitted: 24 October 2019 | Accepted: 12 February 2020 | Published: 2 June 2020

Abstract
Climate change is considered by policymakers as one of the most pressing global issues of our time. International institutions and national governments are, to varying degrees, committed to tackling climate change, but it has only been possible to define a shared system of collective goals across countries through the 2015 United Nations Climate Change Conference in Paris (COP21). A growing interest in climate change policy has been present in the Italian political debate, yet we have little evidence regarding the nature of related climate change debates across Italian policymakers. By using discourse network analysis (DNA) to investigate Italian policymakers' discourses in the Chamber of Deputies during the 17th Italian Legislature (2013–2018), this study shows that debates on climate change-related strategies are largely unpolarized, except for certain issues, and that coalitions emerge over time around core strategies. Groups of policymakers with similar policy beliefs emerge independently from their political affiliations. Our analysis is thus the first to apply DNA to provide empirical evidence of the convergence across Italian policymakers and the potential for the bridging of political discourses on climate change.

Keywords
climate change; discourse network analysis; Italy; Paris COP21 Agreement; policy coalitions

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

The first two decades of the 21st century have seen national governments become increasingly concerned with climate change issues (Pearce, Brown, Nerlich, & Koteyko, 2015). However, policymakers' approaches to dealing with climate change are vague (Biesbroek et al., 2010; Keohane & Oppenheimer, 2016; Kukkonen et al., 2018) or even reductive concerning its causes, when we consider, for example, greenhouse gas emissions (GHG; Dunlap & McCright, 2011). Policymakers are challenged with political conflicts when defining international and national strategies for addressing climate change. The annual United Nations Conferences of the Parties (COP) aim to reduce these conflicts at an international level. However, their effectiveness had been limited in the past by their intrinsic weaknesses, that is until the 2015 United Nations Climate Change Conference (COP21) and the Paris Agreement, which defined collective and binding goals (Victor, 2016). This international approach influenced political debate within countries, contributing to the definition of climate change issues and associated strategies for achieving the Paris targets (Kukkonen, Ylä-Anttila, & Broadbent, 2017).

Previous country-level evidence suggests that climate change is a divisive topic (Kukkonen et al., 2017, 2018) and that one of the main factors influencing policymakers' climate change opinion is their political affiliation (Rossen, Dunlop, & Lawrence, 2015). However, recent studies from across Europe (France, Germany,

the Netherlands, Poland, Spain, Ireland) demonstrate that policymakers belonging to different political groups can share similar positions on climate change (Hess & Renner, 2019; Little, 2017; Marcinkiewicz & Tosun, 2015). Yet, to date, there is little evidence of this having occurred in the third-largest national economy in the Eurozone, Italy.

Our work contributes to the discussion on the nature of coalitions and their relations to political realignment (Kukkonen et al., 2018). Further, this article contributes to the empirical literature on climate change political debates in two ways. First, we focus on the case of Italy, from where we have thus far no evidence on the nature of climate change discourses across policymakers. Second, we use a different empirical basis compared to previous work, by analysing the exact recorded wordings from Italian debates from within the Italian Chamber of Deputies during the 17th Legislature (2013–2018).

2. Background

2.1. Climate Change, Policymaking and the Political Debate

According to the Intergovernmental Panel on Climate Change (IPCC, 2018), our world has entered a new geological epoch, the Anthropocene. The effects of human activities on the Earth's Systems are unprecedentedly significant, causing a constant increase of the GHG and transforming the biosphere. These changes have already produced an intensification of extreme climate events (Diffenbaugh et al., 2017), which negatively impact human activities and ecosystems.

Since the 1980s, two main strategies have been employed by national and international organizations to address the negative effects of climate change: mitigation (e.g., reducing GHG) and adaptation (e.g., actions for addressing the impacts of climate change and reducing vulnerability; Gupta, 2010). During the 1990s, international and national policies initially focused their attention on mitigation, but later it became clear that adaptation measures were also necessary to avoid further negative effects (IPCC, 2018). Faced with these climate change-related effects, National governments put efforts into the creation of international treaties. In the last decades, the annual COP have driven the international debate on climate change; however, this strategy has proven to be ineffective over time, since a universal agreement has always been difficult to achieve (Victor, 2016). Nonetheless, the Paris Agreement defined during the COP21 is considered a success by some observers (Bang, Hovi, & Skodvin, 2016). This agreement includes two collective goals, keeping the rise in average global temperature below 2°C (striving to limit the increase below 1.5°C) and achieving worldwide carbon neutrality between 2050 and 2100, while the strength of the agreement rests on the fact that it "lets countries set their own commitments" (Victor, 2016, p. 135).

As pointed out by Carter, Ladrech, and Little (2014) and Kukkonen et al. (2018), international treaties influence the national policy-making process for establishing environmental targets and strategies. Nevertheless, national policies are developed and implemented by national policymakers, whose opinions on this topic can be divisive (Kukkonen et al., 2017). Among the different elements that influence policymakers' perspectives on climate change, political ideology has a prominent role: In Western countries, right-wing parties are more sceptical about the existence of the climate change phenomena and its impact on the environment, while the political left is more responsive to the warnings from the scientific world (Rossen et al., 2015). However, recent studies show how the convergence of rival political parties on climate change-related issues is increasing, especially in European countries. Marcinkiewicz and Tosun (2015) find that Polish deputies, regardless of their political membership, do not consider climate change as an area of political competition, hence they do not show marked differences in their opinion on this topic. Little (2017) illustrates that the main Irish parties presented a shared consensus on climate policies during the 2016 elections. Consistent with these studies, Hess and Renner (2019) find convergences concerning energy-transition policies between conservative parties and far-right parties in six European countries (France, Germany, the Netherlands, Poland, Spain, and the UK). Recent evidence from European parliament discourses on the politics of climate change provides further evidence for convergence, since it suggests a low level of external politicization, as indicated by low party group polarization, internalization of political conflict at the committee level, and compromise-building between issue dimensions (Wendler, 2019).

Political debates can be useful to understand policymakers' behaviour, which directly influences the political process (Schmidt, 2008). These debates also allow for greater understanding of coalition formation and the prevalence of certain viewpoints over others (Leifeld & Brandenberger, 2019). Furthermore, the formation of coalitions is, within their institutional frameworks, part of the political leadership choices that interact to formulate policy lines and to shape trajectories of economic development and international relations (Oppermann, Kaarbo, & Brummer, 2017). As part of creating such policy lines, coalition formation can shape political re-alignment dynamically, in policy cycles (Howlett, McConnell, & Perl, 2017), and contest the most appropriate policy process (Mukherjee & Howlett, 2015). Such dynamics of policy processes and dueling coalitions of political actors have been explained with the Advocacy Coalition Framework model of Sabatier (1991). Relative to the Advocacy Coalition Framework, other policy frameworks that also explain coalition formation appear more simplistic, as they view policy processes as consisting of sequential, cyclical phases or 'stages' of governmental problem-solving; this has led Howlett et al.

(2017) to reconcile the conceptual pillars of the multiple-stage and cycle models with the Advocacy Coalition Framework, to better model competing coalitions of interests within a policy subsystem.

The role of political coalitions for the sustainability transition has received significant attention (Haukkala, 2018; Hess, 2014). The work of Haukkala (2018) describes how the Finnish green-transition advocacy coalition manages the different points of view expressed by its groups: Different perspectives lead to different strategies, which could affect the coalition's structure. By investigating the role of incumbent regime coalitions, grassroots coalitions, and the countervailing industrial power in the US, Hess (2014) finds that non-state actors are particularly relevant in supporting political campaigns and driving political coalitions' success. The environmental discourse has been further studied through the focus on discourse coalitions in the case of the fracking debate in the UK and the US (Bomberg, 2017; Metze & Dodge, 2016), as well as regarding the polarized discourses around environmental conflict in Australia (Lucas & Warman, 2018), and the construction of urban megaprojects in Germany (Nagel & Satoh, 2019).

2.2. The Italian Context

In one of the first studies dedicated to Italian climate change policy, Marchetti (1996, p. 299) points out that this topic is influenced "by traditional policy styles and the outlooks of key policymakers." Environmental issues have had a marginal role in Italian politics, making Italy one of the last Western countries to enter into the environmental policy arena (Westerhoff, 2010). The first climate policy introduced by the Italian Government was related to the ratification of the *United Nations Framework Convention on Climate Change* in 1994; the *Guidelines for National Policies and Measures regarding the Reduction of GHG Emissions* were introduced in 1998, while the first National Climate Change Conference was organized by the Ministry of the Environment in 2007 (Westerhoff, 2010). Since 2010, Italy has concentrated on the implementation of national climate change adaptation strategies (Pasimeni, Valente, Zurlini, & Petrosillo, 2019), but, on the other hand, it has "not included a line of policy oriented to enhance climate initiatives at the local level, nor has it launched collaborative arenas where national climate action could be discussed" (De Gregorio Hurtado et al., 2014, p. 80).

Climate change was not the main issue in the manifestos of most of the political parties represented in the Italian Parliament (De Blasio & Sorice, 2013). Traditionally, most of the Italian parties were not particularly environment-focused, except for the Green Party; center-left parties have always had an industrialist culture related to their communist tradition, while center-right parties were against climate change legislation because, in their opinion, it would favor bureaucratic dirigisme (Carter et al., 2014). Historically, center-right parties have been against climate change initiatives, as in the case of the 2008 European legislative proposal on energy and climate change, which was contested by the Berlusconi's government because it would have damaged Italian industries (Carbone, 2009). This situation has changed in recent years, as increasing coverage of extreme natural events by national media (Pasquaré & Oppizzi, 2012) has raised climate change awareness within the Italian population (European Investment Bank, 2019), creating a demand for concrete action by policymakers.

Subsequently, new political parties emerged, while traditional parties tried to reorient their political manifesto. The Five Star Movement was created as an anti-establishment party in 2005, and one of its main objectives is the protection of the environment. As illustrated by Lanzone and Woods (2015, p. 57), this party "emerged as a constellation of local issues galvanized around a populist thematic of politics and political representation being about the real people." Its political representatives carry out a communicative strategy where the Movement is portrayed as the only political party interested in the protection of the environment, with the others being portrayed as having contributed to environmental degradation. In reaction to these allegations and to build consensus, political leaders from traditional parties re-framed their climate change positions, pointing out the importance of this topic in the political agenda (Biscotti & D'Amico, 2016). In particular, center and center-left parties (which governed in the 17th Italian Legislature 2013–2018) put effort into the preparation of COP21 (Sartori, 2016), influencing the Italian policymaking process. Furthermore, the ratification of the Paris Agreement and the implementation of the National Plan for Energy and Climate (*Piano Nazionale Integrato per l'Energia e il Cima*) influenced the political debate after COP21. However, we lack empirical evidence and analyses on the Italian political context in which discourse coalitions developed regarding climate change. Since these changes (growing interest in climate change and the influence exerted by the COP21) strongly influenced the Italian political arena and Italian parties, our research question is the following: Which discourse coalitions emerged from the political debate on climate change in Italy?

3. Discourse Network Analysis: Methodology and Data

Discourse coalitions in the political arena depict the political alliances which form around the issues under debate (Fisher, Leifeld, & Iwaki, 2013), since, as pointed out by Leifeld and Haunss (2012, p. 383), "discourses precondition political action." Discourse network analysis (DNA) is a method that facilitates the examination and the visualization of these coalitions by integrating qualitative Content Analysis and quantitative tools derived from Social Network Analysis (Fisher et al., 2013; Fisher & Leifeld, 2019; Leifeld, 2017). It allows the ac-

tors involved in political debates and the coalitions created around specific issues to be mapped and it can be employed to analyse any type of political issue, such as agricultural (Ghinoi, Wesz, & Piras, 2018), environmental (Fisher et al., 2013; Kukkonen et al., 2017), food (Fergie, Leifeld, Hawkins, & Hilton, 2019), immigration (Wallaschek, 2019), and property rights issues (Leifeld & Haunss, 2012).

DNA is applied to statements made by the actors operating in the context object of analysis. A statement is "a text portion where an actor reveals his or her policy beliefs or preferences in the text" (Fisher & Leifeld, 2019, p. 475) on a certain concept. Therefore, actors, concepts, and the agreement relationship between actors and concepts are the fundamental elements of the analysis. There are two types of discourse networks: two-mode and one-mode networks. The former includes two types of nodes, actors and concepts: An actor is linked to a concept if they have expressed a statement about it, and the links (i.e., network ties) can have a positive characterization (if the actor agrees on that concept) or a negative characterization (if the actor does not agree on it). One-mode networks are made by actors, where two actors are linked if they both express a statement on the same concept; the more they make statements on multiple concepts, the thicker the network tie between such actors becomes. Two aggregation methods are used to create one-mode networks: one based on congruence, where a tie is established if two actors both agree on a concept or if they both do not agree; and another based on the presence of conflict, where a tie is established if one actor agrees on a concept and another actor does not agree (Leifeld, 2017). In our work, statements were collected from the verbatim reports of the Chamber of Deputies proceedings for the 17th Italian parliamentary term (2013–2018), which are available online (around 900 verbatim reports are available on the website of the Chamber of Deputies). During that period, Italy had three different Governments supported by a coalition of center and center-left parties (with three Prime Ministers: Enrico Letta, 2013–2014; Matteo Renzi, 2014–2016; and Paolo Gentiloni, 2016–2018).

Since climate change is a multifaceted issue (Wendler, 2019) that entails a broad variety of challenges and potential solutions for mitigation or adaptation, our data collection does not merely focus on who expresses a statement on the existence of climate change, but also on which solutions are proposed to mitigate its effects, or why certain strategies should (or should not) be implemented. We use the existing literature to reference and classify climate change strategies into five main categories: agriculture; energy; industry, innovation, and economy; land planning and management; and migration (Table 1). As illustrated in the IPCC report (2018), agriculture is particularly sensitive to climate change and a number of strategies can be developed to reduce GHG and adapting to climate change. In particular, the IPCC focuses on increasing food security, providing education to farmers, and supporting the adoption of Genetically Modified Organisms (GMOs), i.e., solutions related to the innovativeness of the agricultural sector. In addition to these strategies, policymakers are also focused on strategies for supporting (or not) the livestock sector in order to reduce its emissions (Gerber et al., 2013b). The energy sector directly impacts the volume of emissions and it is strictly related to climate change. According to the IPCC report (2018), several energy strategies influence, positively or negatively, the production of GHG: coal extraction; support of renewable energies; oil and gas drilling; production and use of nuclear energy; carbon capture and storage. In order to reduce GHG, energy efficiency should be increased and a waste management system for producing energy from composting waste must be implemented (Biala, 2011; IPCC, 2018); moreover, regarding waste management, another issue concerns the development of incinerators and their impact in terms of GHG (European Commission, 2001). Industrial and economic strategies for challenging climate change are particularly extensive. The UN (2015) support economic strategies which aim to introduce pollution taxes and reduce tax advantages for polluting companies, thus promoting the green economy and green jobs, and supporting technological innovation for sustainability. The IPCC (2018) recommends strengthening the public transport system and investing in the formation of sustainability professionals for business activities. In addition to the proposals of international organizations, new economic paradigms have arisen in recent decades: the degrowth paradigm and the circular economy paradigm. The former (Latouche, 2010) introduces the idea that infinite growth is un-realistic and un-sustainable, therefore degrowth is necessary to reduce GHG and tackle climate change. The latter is based on the 3R's concept (reduce, reuse, and recycle) and the design of business strategies to close resource loops and lower the impact of human activities on the environment (Circle Economy, 2019). Finally, the IPCC report (2018) highlights that those communities dependent on agriculture will be negatively influenced by the global temperature rise, which will increase migration flows from Southern countries and vulnerable areas, and the International Organization for Migration (2008) points out the importance of distinguishing between refugees, migrants, climate refugees, and climate migrants. This issue is particularly relevant in the Italian context: Italy is the first country of arrival (together with Greece and Spain) for individuals coming from the Middle East and African countries (Locchi, 2014), therefore it needs a strategy for handling migrants and refugees.

Since the Paris Agreement was discussed and ratified by the Italian Chamber of Deputies on the 19th of October, 2016, the time window of our analysis is based around this date. We analyzed the political debates by focusing on two discourse networks, pre- and post-October 2016, in order to distinguish between those which occurred before the ratification and those which occurred since then as we assume that deputies modified their ex-

pectations (in terms of environmental targets to pursue) before and after that event. The data coding and management was carried out via the Discourse Network Analyzer software (Leifeld, 2010). For network visualization and analysis, we use Ucinet (Borgatti, Everett, & Freeman, 2002) and the visone software. Once uploaded the verbatim reports, the text parts dedicated to climate change were extrapolated by using the following keywords: 'climate change' (in English), 'climate' (in English), '*clima*' (in Italian), '*cambiamento climatico*' (in Italian), and '*cambiamenti climatici*' (in Italian). Then, the policy beliefs of the members of the Chamber of Deputies appearing in the selected text parts were manually coded. In total, we mapped 121 deputies (out of 630) who made at least one statement on a climate change-related strategy. From the verbatim reports, we retained 348 statements that: 1) Encompassed the relevant keywords; and 2) were coherent with the strategies illustrated in Table 1. Most of these statements (around 80%) were dedicated to the discussion of one single strategy, while the 6% was dedicated to the discussion of three or more strategies. The most debated strategies were those focused on land planning and management, renewable energies, and oil drilling activities. Following Fisher and Leifeld (2019), statements pre- and post-October 2016 were first transformed into actor-by-strategy matrices, which are the equivalent of two-mode networks, where a tie has a positive characterization when a deputy agrees on a certain strategy (e.g., if a deputy supports oil drilling activities) and a negative characterization otherwise (e.g., if a deputy does not support oil drilling activities). Duplicate statements were ignored in the matrix creation. Then, the two-mode networks were converted into one-mode networks, by using the congruence network approach and the conflict network approach (Leifeld, 2017). Using the congruence network approach, deputies with similar beliefs on a certain strategy, both in a positive in a negative way, are linked together with edges that are proportionally weighted to the number of shared beliefs; with the conflict network approach, deputies are linked if they have an opposite view on a certain strategy. In the creation of these networks, we used the normalization method of the edge weights illustrated by Leifeld (2017), in order to remove potential problems due to core-periphery structures. Moreover, we also created additional networks where 'weak' edges (edges with a

Table 1. Strategies related to climate change.

Strategy ID	Strategy	Category	Reference
FOOD	Increase food security	Agriculture	IPCC (2018)
FARM_EDU	Provide specific education to farmers		IPCC (2018)
LIVESTOCK	Support the livestock sector		Gerber et al. (2013b)
GMO	Support GMO production		IPCC (2019)
COAL	Support coal extraction	Energy	IPCC (2018)
INCINE	Developing incinerators		European Commission (2001)
COMPOST	Support composting waste		Biala (2011)
EN_EFF	Increase energy efficiency		IPCC (2018)
EN_RENEW	Support renewable energies		IPCC (2018)
OIL_DRI	Support oil drilling activities		IPCC (2018)
GAS_DRI	Support gas drilling activities		IPCC (2018)
NUCLEAR	Production and use of nuclear energy		IPCC (2018)
CARB_CAPT	Support carbon capture and storage		IPCC (2018)
DEGROWTH	Transition to degrowth	Industry and economy	Latouche (2010)
POLL_TAX	Introduction of a pollution tax (*tassa di scopo*)		UN (2015)
GREEN_ECO	Promoting green economy (e.g., increasing green jobs)		UN (2015)
INNO_SUST	Support technological innovation for sustainability		UN (2015)
TRANSPORT	Support public transports		IPCC (2018)
CIRCULAR	Transition to circular economy (reduce, reuse, and recycle)		Circle Economy (2019)
PROF_EDU	Training sustainability professionals		IPCC (2018)
TAX_ADV	Reduce tax advantages for polluting companies		UN (2015)
LAND	Reducing land consumption; management of parks, forests, and coastal areas	Land planning and management	IPCC (1991)
ECO_MIG	Legal recognition of eco-migrants	Migration	International Organization for Migration (2008)

normalized weight below 50%) were removed and the Louvain method for community detection was applied to detect hyperplanes according to cluster memberships (i.e., groups of deputies sharing multiple policy beliefs, in the case of congruence networks, or strong conflicts, in the case of the conflict networks).

4. Results and Discussion

In order to facilitate the interpretation of the results, each political party was attributed to a specific political position, adopting the classical 'left–right' dichotomy. Table 2 illustrates the number of statements expressed by the deputies on climate change, grouped by political party and period of observation. The deputies of the Democratic Party (*Partito Democratico*) and the Five Star Movement (*Movimento 5 Stelle*) were prevailing in the climate change debate, covering almost 50% of the related statements expressed during the Legislature. In particular, two deputies from the Five Star Movement were highly involved in the debate, namely Mirko Busto and Massimo Felice De Rosa (Table 3), who expressed around 15% of the total mapped statements.

Figures 1 and 2 show the two-mode networks, with deputies represented by circles of different colors (expressing their political affiliation) and strategies represented by pink squares. Green ties indicate positive statements, while red ties refer to negative statements. As illustrated by these figures, deputies concur on several strategies. They strongly agree on the support for renewable energies (EN_RENEW) and the introduction of novel approaches to land management (LAND). The production of energy from renewable sources has exponentially increased in Italy in recent decades (Legambiente, 2015), and Italian politicians seem to recognize the positive effects of supporting renewables in economic and environmental terms. On the other hand, Italy has a history of abandoning its internal and peripheral areas in favor of urbanized areas (Carrosio, 2019), which has therefore led to greater exposure to extreme events (Istituto Superiore per la Protezione e la Ricerca Ambientale, 2018), causing damage and incidents which have attracted public attention. However, a group of right and center–right wing deputies are against the idea of degrowth (DEGROWTH) and generally oppose any economic approach that could harm Italian firms. This strategy was also debated before the ratification of the Paris Agreement when the possibility of new legal restrictions was of concern to the manufacturing sector; after the Paris ratification, it was no longer discussed in the Legislature. Another group, mainly composed of left and center–left wing deputies and deputies from the Five Star Movement, jointly oppose GMO deployment and are advocates for traditional/biological farming methods (GMO). Since the agri-food sector is particularly important to the Italian economy, this strategy takes a lot of space in the public debate, which is divided between the negative opinions regarding GMOs espoused by the main national association of Italian farmers (*Coldiretti*) and the positive assessment of the scientific community (Pellegrino, Bedini, Nuti, & Ercoli, 2018). However, the former seems to prevail in the Italian Chamber of Deputies.

Table 2. Participation in climate change debates: Number of statements by political party.

		Statements pre-October 2016		Statements post-October 2016	
Political party	Political position	N°	%	N°	%
Alternativa Libera-Possibile	Left	7	2.5	2	3.1
Articolo 1—Movimento Democratico e Progressista	Left	1	0.4	5	7.7
Sinistra Ecologia Libertà	Left	62	21.9	6	9.2
Democrazia Solidale—Centro Democratico	Centre-left	7	2.5	1	1.5
Partito Democratico	Centre-left	73	25.8	14	21.5
Partito Socialista Italiano—Liberali per l'Italia —Indipendenti	Centre-left	5	1.8	1	1.5
Alternativa Popolare—Centristi per l'Europa—NCD	Centre	13	4.6	0	0.0
Civici e Innovatori	Centre	7	2.5	2	3.1
Misto—Minoranze linguistiche	Centre	1	0.4	0	0.0
Misto—Nessuna componente	Centre	2	0.7	1	1.5
Scelta Civica per l'Italia	Centre	2	0.7	3	4.6
Movimento 5 Stelle	Protest party	62	21.9	18	27.7
Alleanza Liberalpopolare—Autonomie	Centre–right	2	0.7	0	0.0
Forza Italia—Il Popolo della Libertà	Centre–right	12	4.2	3	4.6
Fratelli d'Italia—Alleanza Nazionale	Right	2	0.7	3	4.6
Lega Nord	Right	20	7.1	1	1.5
Government/Speaker of the Chamber of Deputies	No political position	5	1.8	5	7.7
Total		283	100.0	65	100.0

Table 3. Ten most active deputies on climate change debates.

Deputy	Political party	Political position	Statements pre-October 2016 (N°)
Mirko Busto	Movimento 5 Stelle	Protest party	20
Stella Bianchi	Partito Democratico	Centre–left	20
Serena Pellegrino	Sinistra Ecologia Libertà	Left	17
Massimo Felice De Rosa	Movimento 5 Stelle	Protest party	15
Filiberto Zaratti	Sinistra Ecologia Libertà	Left	14
Chiara Braga	Partito Democratico	Centre-left	9
Adriano Zaccagnini	Sinistra Ecologia Libertà	Left	8
Susanna Cenni	Partito Democratico	Centre–left	8
Samuele Segoni	Alternativa Libera-Possibile	Left	7
Salvatore Matarrese	Civici e Innovatori	Centre	6

Deputy	Political party	Political position	Statements post-October 2016 (N°)
Mirko Busto	Movimento 5 Stelle	Protest party	7
Enrico Borghi	Partito Democratico	Centre–left	5
Massimo Felice De Rosa	Movimento 5 Stelle	Protest party	3
Serena Pellegrino	Sinistra Ecologia Libertà	Left	3
Adriano Zaccagnini	Sinistra Ecologia Libertà	Left	2
Ermete Realacci	Partito Democratico	Centre-left	2
Gian Luca Galletti	Goverment		2
Monica Faenzi	Alleanza Liberalpopolare—Autonomie	Centre–right	2
Samuele Segoni	Alternativa Libera-Possibile	Left	2
Walter Rizzetto	Fratelli d'Italia—Alleanza Nazionale	Right	2

Two strategies emerge as highly divisive: the support for oil drilling activities (OIL_DRI) and the legal recognition of eco-migrants (ECO_MIG). While the first concerns the opposition of left-wing deputies and deputies from the Five Star Movement to the energy policy of the Italian Government, which envisaged the exploration of new oil deposits for reducing Italy's dependence on imported energy supplies, the latter is mainly a left-wing/right-wing

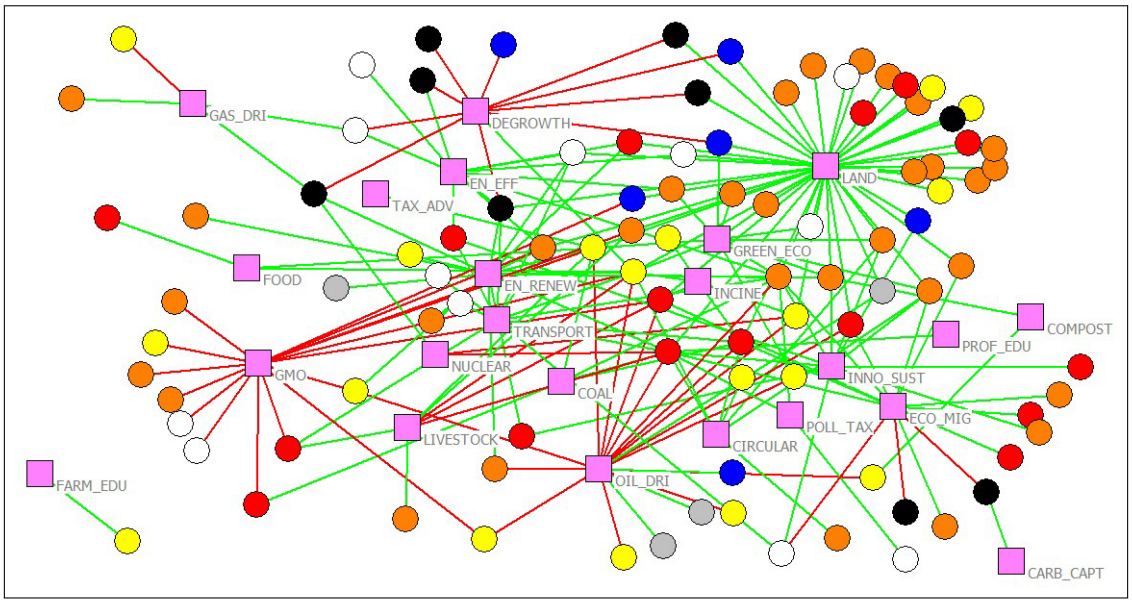


Figure 1. Pre-October 2016 two-mode network. Notes: Pink squares = debated strategies; red circles = left parties' deputies; orange circles = center–left parties' deputies; white circles = center parties' deputies; yellow circles = protest parties' deputies; blue circles = center–right parties' deputies; black circles = right parties' deputies; grey circles = members of the Government/Speaker of the Chamber of Deputies. Green ties indicate that policymakers agree on certain strategies; red ties indicate their disagreement.

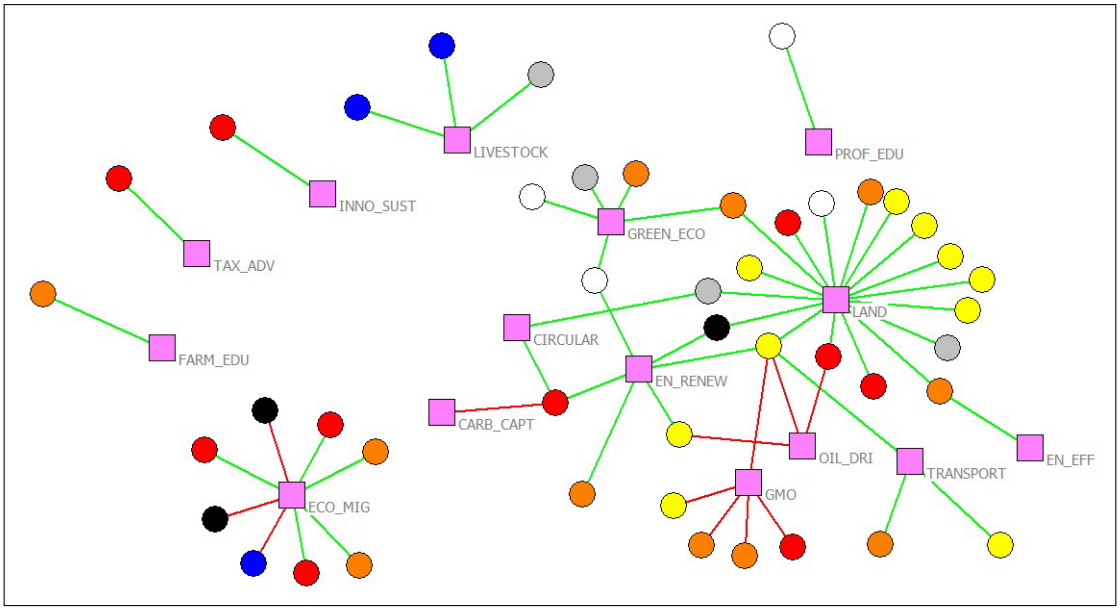
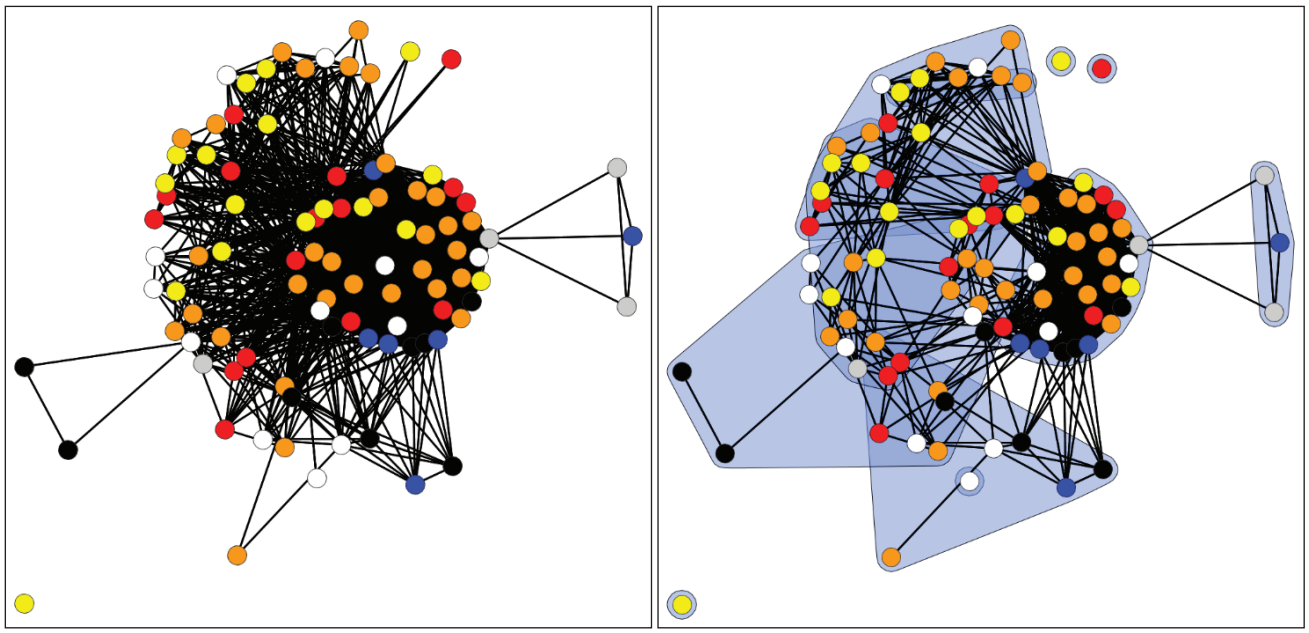


Figure 2. Post-October 2016 two-mode network. Notes: Pink squares = debated strategies; red circles = left parties' deputies; orange circles = center–left parties' deputies; white circles = center parties' deputies; yellow circles = protest parties' deputies; blue circles = center–right parties' deputies; black circles = right parties' deputies; grey circles = members of the Government/Speaker of the Chamber of Deputies. Green ties indicate that policymakers agree on certain strategies; red ties indicate their disagreement.

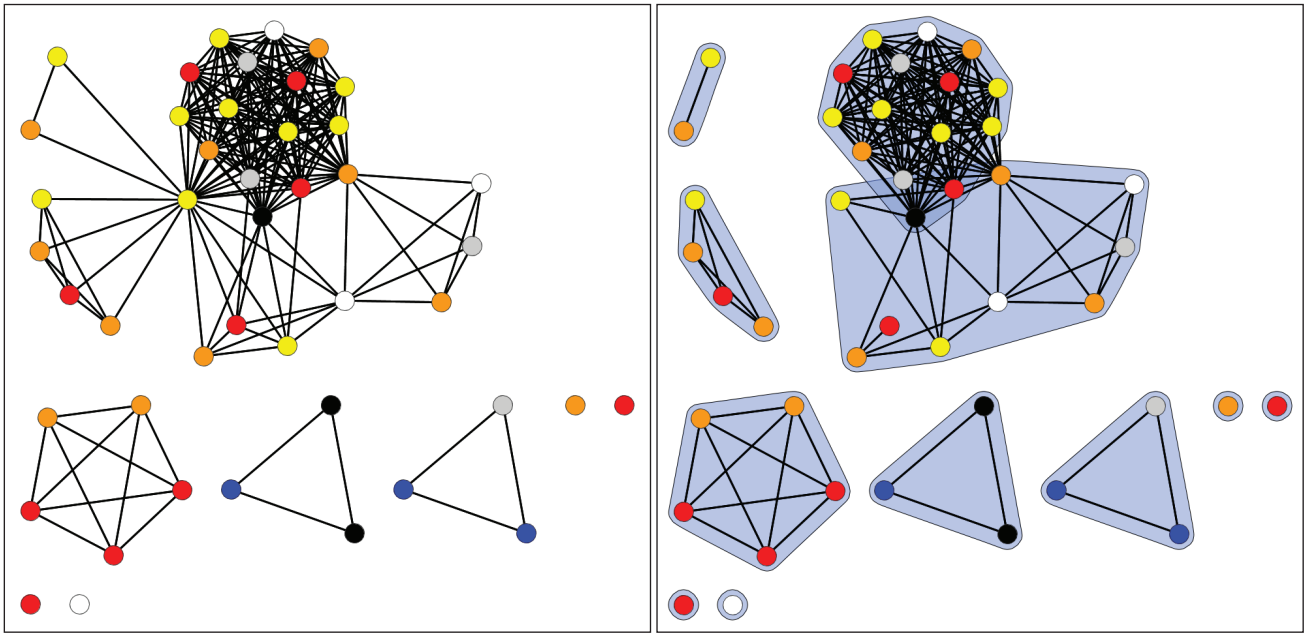
conflict. Yet, this is probably the only strategy where there is a clear distinction between the two opposing sides of the political arena, which are unable to find a solution for this issue.

Figures 3–6 show the one-mode networks that were created from the two-mode networks (Figures 1 and 2). These figures illustrate more clearly the presence of discourse coalitions and conflict between Italian deputies. In the pre-ratification period of the Paris Agreement (Figures 3 and 5), a central cloud of policymakers emerged who shared several policy beliefs, from different political parties, in the congruence network; how-



(a) **(b)**

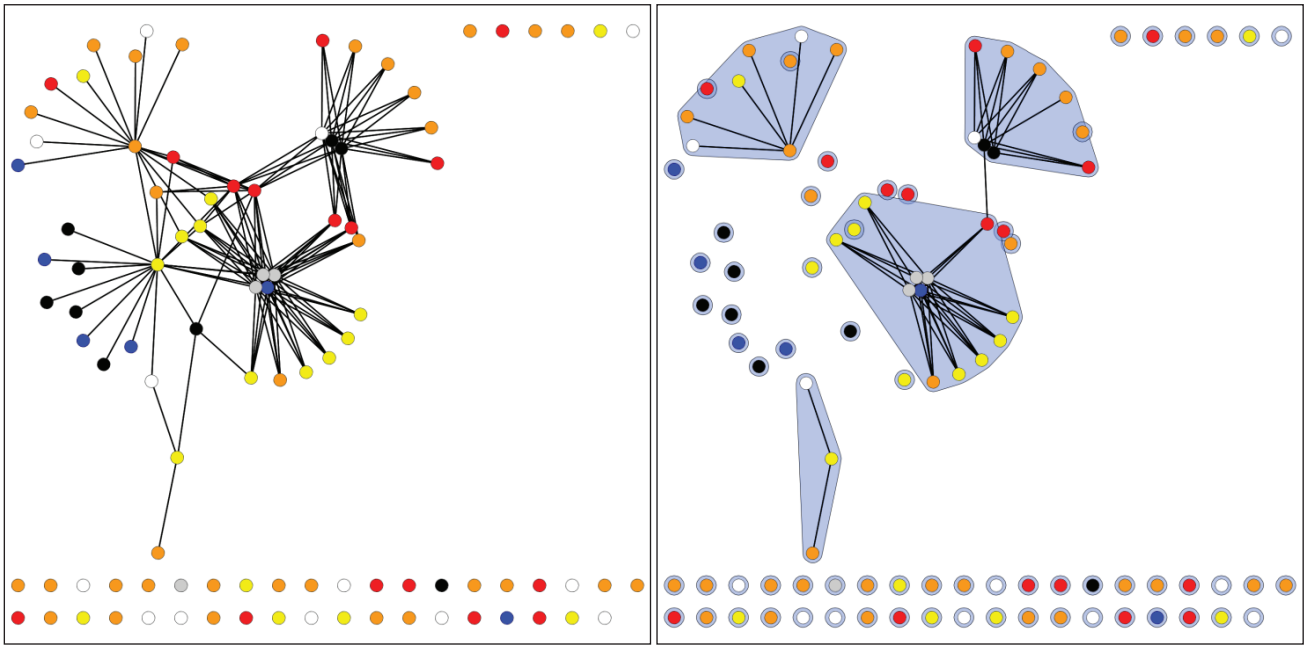
Figure 3. Pre-October 2016 congruent one-mode networks. **(a)** Total. **(b)** Threshold+hyperplanes. Notes: Red circles = left parties' deputies; orange circles = center–left parties' deputies; white circles = center parties' deputies; yellow circles = protest parties' deputies; blue circles = center–right parties' deputies; black circles = right parties' deputies; grey circles = members of the Government/Speaker of the Chamber of Deputies.



(a) (b)

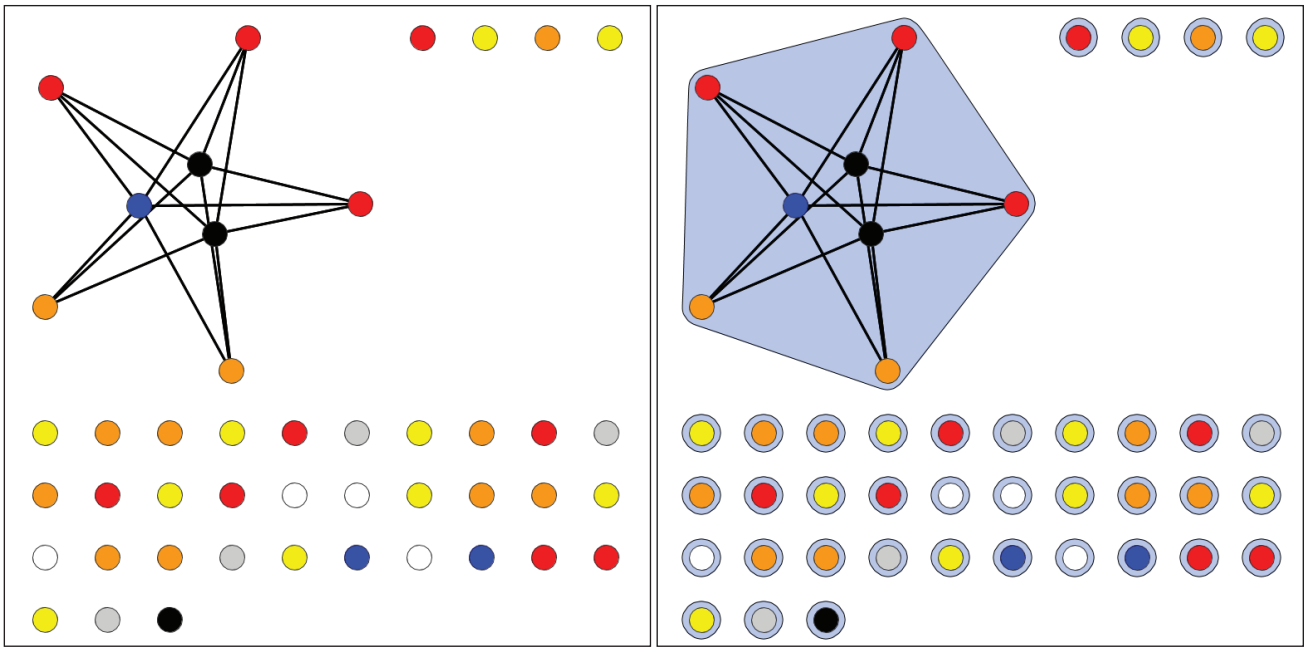
Figure 4. Post-October 2016 congruent one-mode networks. **(a)** Total. **(b)** Threshold+hyperplanes. Notes: Red circles = left parties' deputies; orange circles = center–left parties' deputies; white circles = center parties' deputies; yellow circles = protest parties' deputies; blue circles = center–right parties' deputies; black circles = right parties' deputies; grey circles = members of the Government/Speaker of the Chamber of Deputies.

ever, by looking at Figure 3b, deputies from the center–left parties (orange nodes) are predominant in this cloud, sharing strong linkages. The conflict network (Figure 5) shows that disputes arise from deputies with different political positions, as expected; there is only one exception, a deputy from a center–left party that does not agree on a strategy supported by colleagues (see the top left hyperplane in Figure 5b). However, it is inter-



(a) (b)

Figure 5. Pre-October 2016 conflict one-mode networks. **(a)** Total. **(b)** Threshold+hyperplanes. Notes: Red circles = left parties' deputies; orange circles = center–left parties' deputies; white circles = center parties' deputies; yellow circles = protest parties' deputies; blue circles = center–right parties' deputies; black circles = right parties' deputies; grey circles = members of the Government/Speaker of the Chamber of Deputies.



(a) (b)

Figure 6. Post-October 2016 conflict one-mode networks. **(a)** Total. **(b)** Threshold+hyperplanes. Notes: Red circles = left parties' deputies; orange circles = center–left parties' deputies; white circles = center parties' deputies; yellow circles = protest parties' deputies; blue circles = center–right parties' deputies; black circles = right parties' deputies; grey circles = members of the Government/Speaker of the Chamber of Deputies.

esting to note that the Five Star Movement is always involved in emerging conflicts, trying to legitimate its role as a protest party. Regarding the post-ratification period (Figures 4 and 6), networks appear much polarized. In the congruence network (Figure 4), the classical 'left–right' dichotomy is more pronounced, while the Five Star Movement loses its protesting nature: in particular, deputies from center–right and right parties support certain strategies, which are not discussed by other deputies (supporting the livestock sector, LIVESTOCK; see Figure 2) or even contrasted by center–left and left parties (the eco-migrants issue, ECO_MIG; see Figure 2). Indeed, this conflict on the legal recognition of eco-migrants is pretty much evident in Figure 6, as it is the only strategy where left/center–left and right/center–right parties do not strongly agree. Coalitions arising from congruence networks can be analyzed according to the political homophily literature. Political homophily occurs when actors with similar political characteristics express similar policy beliefs (Gerber, Henry, & Lubell, 2013a). The homophily between political groups (in our case, political parties sharing the same political position; see Table 2) is measured using the Krackhardt and Stern's (1988) E-I index, which allows one to understand if a group is more externally or internally oriented, in terms of their shared beliefs. This index ranges between −1 and 1: Scores close to −1 indicate that deputies agree only with those who share the same political position; scores close to 0 show that deputies share similar beliefs equally with those who have the same political position and those who do not; scores close to 1 suggest a tendency to share policy beliefs with deputies who have different political positions. We estimate the E-I index by focusing on the congruence networks pre- and post-October 2016 (Table 4); we do not concentrate on the conflict networks because deputies with similar political positions rarely disagree with one another (except for the center–left deputy discussed above; see Figure 5b), i.e., the E-I index would have been biased. In general, we do not detect high levels of political homophily, since E-I indexes

Table 4. E-I index.

Political position	E-I index pre-October 2016	E-I index post-October 2016
Left	0.619	0.662
Centre–left	0.260	0.696
Centre	0.762	0.862
Protest party	0.530	0.284
Centre–right	0.852	0.333
Right	0.708	0.833
No political position	0.826	0.897

are often in between 0.500 and 1, which means that deputies share similar policy beliefs with those who have different political positions. In the pre-October 2016 period, the center–right group shows the higher E-I index while the center–left group has an index close to zero. After the ratification of the Paris Agreement, the center–right group's index dropped to 0.333, while almost all other groups increased their indexes, which indicates that Italian parties had become more collaborative during this period. Moreover, the E-I indexes showed by the Five Star Movement (protest party) indicate that this party was not totally open to supporting the strategies shared by other parties, nor was it totally withdrawn, despite its conflict over several topics with others.

These results suggest that members of the center–left governing parties (*Partito Democratico*, *Partito Socialista Italiano—Liberali per l'Italia—Indipendenti*, *Democrazia Solidale—Centro Democratico*, and other parties who supported the three Governments of the Legislature) formed a more cohesive group during the period before the Paris Agreement ratification. In contrast, the *Movimento 5 Stelle* alternated between having shared policy beliefs and strong political conflict with the other parties.

5. Conclusions

This work contributes to the growing body of knowledge on climate change policymaking, providing empirical evidence on the Italian case study. It applies DNA to investigate the political debate on climate change by the Italian Chamber of Deputies. Our analysis suggests that, consistent with previous studies on European countries (e.g., Hess & Renner, 2019; Little, 2017; Marcinkiewicz & Tosun, 2015), climate change is an issue where rival political parties can have convergent policy beliefs. This is reflected also in the declarations expressed by the Italian deputies: most of them have stated their total support to the Paris Agreement, with only the deputies of the *Lega Nord* party abstaining from the final vote.

However, some divisive strategies were identified among political parties related to climate change. Since Italian policymakers generally accept the evidence of climate change (only one deputy has denied the existence of a correlation between human activities and climate change: Paolo Tancredi, from *Alternativa Popolare—Centristi per l'Europa—NCD*), situations of conflict arise when the debate focuses on the strategies to cope with this problem. Deputies from the left and center–left parties and the Five Star Movement were predominant in the political debate, creating persistent coalitions over time around certain core strategies that were also supported by other policymakers (e.g., reduction of land consumption and management of green areas, and support for renewable energies). However, despite the absence of strong conflicts, a small-scale polarization is visible in the Italian political arena, which is more evident when the debate switches to sensitive topics such as immigration and the economy (for example, oil drilling activities). Shifting to a more pro-active attitude towards climate change adaptation actions has fostered new debates in Italy, modifying the positioning of policymakers and supporting the creation of both new alliances and divisions according to the topic. This polarized debate that we identified with DNA in the case of oil drilling could not only be related to previous case study evidence from Australia on polarized discourses around environmental conflict (Lucas & Warman, 2018) but also to the application of discourse analysis to distinguish between competing coalitions and their shared narratives in the UK fracking debate (Bomberg, 2017), as well as to the application of discursive boundary work to study the dynamics of discourse coalitions in the US fracking debate (Metze & Dodge, 2016).

In sum, our study's empirical contribution is thus to employ DNA to the Italian climate change political debate, highlighting that political conflicts are driven by political strategies to cope with climate change. Furthermore, the complexities that we have empirically identified as part of this debate (including the concurrence on distinct strategies) suggest that a conceptual simplification of viewing the environmental policy processes as consisting of sequential or cyclical phases of governmental problem-solving (e.g., Burton, 2006) is probably less appropriate, in line with Howlett et al.'s (2017) call for more complex conceptual models that enable us to better understand competing coalitions of interests within a policy subsystem.

Nevertheless, this study faces two main limitations. First, we have no information on the Senators' statements. The Italian Parliament consists of the Chamber of Deputies and the Senate, but the verbatim reports from the senators include collective statements. Therefore, we could not distinguish which senator had pronounced a specific policy belief, while assigning one policy belief to multiple senators could bias the analysis. Second, we were not able to investigate the linkage between deputies' statements and the actual implementation of climate change-related strategies. Further analysis should be dedicated to investigating the influence of environmental advocacy coalitions for implementing dedicated policies.

Acknowledgments

We would like to thank the two anonymous reviewers as well as the Academic Editor of this thematic issue (Professor Philip Leifeld) for their helpful comments. We also gratefully acknowledge our colleagues from the Department of Economics and Management, University of Helsinki, for the fruitful discussions about climate change.

Conflict of Interests

The authors declare no conflict of interests.

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Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 229–242
DOI: 10.17645/pag.v8i2.2611

Article

Gatekeeping the Plenary Floor: Discourse Network Analysis as a Novel Approach to Party Control

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Submitted: 1 November 2019 | Accepted: 12 February 2020 | Published: 2 June 2020

Abstract
In the German parliament, the Bundestag, floor time is a scarce resource and is allocated to MPs by leaders of their respective parliamentary party groups. Previous research indicates that highly salient plenary debates tend to be dominated by party leaders and other loyal frontbenchers. Plenary speeches can therefore offer only limited insights into party unity. Any MP can give a so-called 'explanation of vote' (EoVs) to justify their voting decision and/or express their point of view. These written statements provide a more accurate depiction of the range of viewpoints present within legislative parties. In order to assess the effect of party control on observed party unity and parliamentary contestation, discourse network analysis has been employed in this study to compare legislative speech with EoVs in debates on the Greek crisis between 2010 and 2015. Discourse network analysis combines content analysis with an actor-centred approach, and this is the first time this method has been used to study party control and (dis)unity. Bundestag debates on the Greek crisis present an interesting case study, as the issue became increasingly controversial over time, both in the public and the legislature. While this became evident in declining voting unity and individual-level mobilisation through EoVs, the extent to which gatekeeping impedes contestation on the plenary floor needs to be assessed. In terms of representation, it is important that European Union issues not only make it to the plenary agenda but that these debates also reflect the different viewpoints of MPs.

Keywords
Bundestag; Christian Democrats; discourse network analysis; euro crisis; Germany; legislative behaviour; party politics; political discourse; social networks

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

The German parliament, the Bundestag, has generally been characterised by high levels of party unity (Bergmann, Bailer, Ohmura, Saalfeld, & Sieberer, 2016) and a solid cross-partisan consensus in favour of European integration (Lees, 2008; Wimmel & Edwards, 2011). During the euro crisis, both these attributes of German parliamentarism have come under pressure. The increasing contestation of issues revolving around the euro crisis, particularly the situation in Greece, manifested itself in (1) declining voting unity, as above-average levels of voting defection across all parliamentary party groups were witnessed, and (2) heightened parliamentary communication in the form of personal statements known as 'explanations of vote' (EoVs). Contrary to general tendencies in the Bundestag (Bergmann et al., 2016), increasing party disunity was largely driven by the Christian Democrats (Bhattacharya & Papageorgiou, 2019; Degner & Leuffen, 2016).

Voting dissent, especially in government parties, gets media coverage, but the most visible forum and channel of parliamentary communication is the plenary assembly. Plenary debates are often broadcast, and they are "one of

the most important institutional sources from which journalists obtain information about the most important concerns of citizens" (de Ruiter & Vliegenthart, 2018, p. 656). Therefore, it is important that EU matters make it to the agenda of plenary sessions and are publicly debated (e.g., Auel & Raunio, 2014), but the analysis should not stop there. From a discursive perspective, we cannot take it for granted that these debates also reflect the range of viewpoints present across *and within* legislative parties.

In fact, EU politics continue to pose a challenge to party unity: Matters of European integration and EU decision-making often cut across historically established cleavage lines. As party systems have generally been reluctant to adapt, mainstream parties tend to be internally less cohesive on EU issues than other policy issues (Bakker, Jolly, & Polk, 2012; Hix, 1994; Hooghe, Marks, & Wilson, 2002; Marks, Hooghe, Nelson, & Edwards, 2006). This is especially the case for conservative and Christian Democratic parties with a centrist position on European integration. While these parties endorse economic integration on pragmatic grounds, "as defenders of national culture, language, community, and above all national sovereignty" (Edwards, 2009, p. 7) they are much more sceptical towards transnationalism and political integration (Marks & Wilson, 2000).

We would expect that leaders of less cohesive parties would still try to present a united front in plenary debates. Proksch and Slapin (2015, p. 9) argue that in countries like Germany "where the electoral system creates strong incentives for parties to cultivate and protect a single party image to present to voters, party leaders monitor and control their MPs' access to the floor." The extent to which they succeed depends to a significant degree on the (formal and informal) rules of speechmaking, because "party leaders are effective in disciplining legislators only when institutional arrangements enable them to do so" (Giannetti & Pedrazzani, 2016, p. 775). In the Bundestag, parliamentary party groups are allocated a fixed amount of floor time depending on their size, and as in many other legislatures (Giannetti & Pedrazzani, 2016), each group then needs to decide how to distribute the allocated time among its members. In the Bundestag, this power lies with the party leaders, and empirical evidence has confirmed that this leads to the exclusion of critical voices: The more importance parliamentary party group leaders attach to a debate, the more they are inclined to speak themselves and favour the most loyal colleagues who toe the party line over MPs who are ideologically distant from the party leadership (Bhattacharya & Papageorgiou, 2019; Proksch & Slapin, 2012, 2015). Restrictive or party-centred rules of speechmaking are therefore an important instrument in the toolbox that German party leaders use to maintain unity when cohesion is low (Bailer, 2018).

Although in the German case, party-centred rules have the effect of excluding backbenchers in salient EU debates, critical MPs who disagree with their party leadership strongly enough use EoVs as a channel of expression (Bhattacharya & Papageorgiou, 2019). When a debate has concluded, each MP "may make an oral statement on the final vote lasting not more than five minutes or submit a short, written statement, which shall be included in the minutes of plenary proceedings" (German Bundestag, 2014, Rule 31, para. 1). The vast majority of MPs choose to deliver these statements in written form, and they use them for one of three reasons: (1) to voice reservations despite voting along the party line, (2) to explain deviant voting behaviour, or (3) to give statements that demonstrate party loyalty (Becher & Sieberer, 2008; Sieberer, 2015). In the absence of direct access to intra-party preferences, EoVs offer the most meaningful data source in the German context (Zittel & Nyhuis, 2019).

The primary objective of this study is to demonstrate why it matters who speaks for the party and to provide novel empirical insights into parliamentary party unity and unity of government vs. opposition actors. Unity is the "observable degree to which members of a group act in unison" (Sieberer, 2006, p. 151). In line with the recent scholarship that approaches party unity as a dynamic and multidimensional concept (Close & Gherghina, 2019; Zittel & Nyhuis, 2019), I follow the view of Van Vonno, Malka, Depauw, Hazan, and Andeweg (2014), according to which unity is the outcome of the sequential interaction between agreement, loyalty and discipline. In other words, there are several ways to reach unity, and intra-party agreement is only one of them. This article offers a discursive perspective on parliamentary party unity that is currently missing from the literature. It approaches the under-researched question of the impact of party control over floor time on discursive party unity and the government–opposition divide from a new methodological angle: In a comparative research design, I employed discourse network analysis (DNA), which integrates qualitative content analysis with quantitative network analysis (Leifeld, 2016, 2017), in order to examine the impact of party control on parliamentary contestation across communication channels, actors and debates.

The debates on the Greek crisis provide a suitable case study, because public opinion was much more sceptical than party positions in the Bundestag about granting financial aid to Greece. We can observe how this controversial issue has been disputed between (government and opposition) parties and within parties over the time period of five years. Another interesting aspect about these debates is that the President of the Bundestag granted extra time to one or two dissenters from the government parties per debate, for which he was heavily criticised (Proksch & Slapin, 2015, pp. 33–34). The empirical findings show that the government coalition still appeared much more united on the plenary floor than the opposition, whereas the opposite is the case for EoVs. This suggests that party control of floor time is more important for government parties. Confirming cleavage theory, the case study of the Christian Democrats reveals that the party was indeed challenged by considerable internal disagreement.

In the next two sections, I discuss the relevance of plenary debates and introduce the main concepts such as party unity, party cohesion and party control. Furthermore, I review the literature on national party unity with regards to EU politics. Section 4 describes the original dataset and highlights how DNA and social network statistics are applied in this study to enhance our understanding of party unity and group coherence in the parliamentary setting. Section 5 presents the analytical results, showing how contestation patterns vary between plenary speeches and EoVs as well as between parties. In a case study of the Christian Democrats, I explore the potential of DNA to provide empirical insights into party dissent. The conclusion summarises the main methodological contributions of this article.

2. Parliamentary Contestation: The Significance of Party Control

Communication and contestation in the parliamentary setting are largely structured by executive–legislative relations and party politics. Debates in the plenary assembly serve two main purposes: (1) to publicly hold the executive to account (i.e., government-related function) and (2) to communicate issue interpretations and solutions to the electorate (i.e., citizen-related function). Since the publication of the seminal report *Toward a More Responsible Two-Party System* (American Political Science Association, 1950), the Responsible Party Model has been subject to critical reviews, but the basic notion that the electorate must be given a choice between at least two parties offering different policy proposals has prevailed. This presumes a certain level of party unity, because voters need to be aware of differences in policy preferences and issue emphases, and when elected, parties need to be able to bring about the policy changes and problem solutions they advocated (Schmitt & Thomassen, 1999, pp. 113–116).

However, legislative parties are not unitary actors. They are heterogeneous, hierarchical organisations with internal norms and rules. Variance in parliamentary party unity has been explained by system-level factors, especially the form of government and the electoral system (e.g., Carey, 2007; Kailitz, 2010), and party characteristics (e.g., Borz, 2009; Little & Farrell, 2017). More recently, party unity in the parliamentary setting has been approached as a multidimensional and dynamic concept (Close & Gherghina, 2019; Zittel & Nyhuis, 2019). Firstly, we need to make a distinction between (1) *party unity* observable in terms of legislative behaviour, (2) intra-party agreement or preference homogeneity, that is, *party cohesion*, (3) *party discipline*, meaning the internal rules and norms that make legislators act in certain ways (Hazan, 2014; Little & Farrell, 2017), and (4) *party control*, that is, the extent to which parliamentary party groups and their leaders, rather than individual MPs themselves or other legislative actors (e.g., the Speaker, the procedure committee or committee chairs), determine parliamentary proceedings, legislative activity and debating activity. What we generally observe is the extent to which members of a parliamentary party group "act in unison" (Sieberer, 2006, p. 151), that is, party unity, and the most common empirical indicator for party unity is voting unity, measured through roll-call analysis (e.g., Carey, 2007, 2009; Sieberer, 2006). But roll calls by themselves do not tell as much about MPs' preferences, and thereby party cohesion. As Carroll and Poole (2014, p. 116) highlight, "for researchers aiming to obtain a measure of preferences, roll-call votes are only as useful as the underlying process by which they are generated," because voting unity is an outcome of the interaction between cohesion and discipline (Van Vonno et al., 2014), and as we generally lack direct access to study discipline, we cannot easily infer cohesion from unity.

A similar point can be made about party unity in parliamentary debates. It is questionable the extent to which legislative debates serve a genuine deliberative function (Bächtiger, 2014), representing the range of viewpoints present among legislators across and within legislative parties. Legislative speech has been used to analyse MPs' positions (e.g., Lauderdale & Herzog, 2016; Laver & Benoit, 2002), but we need to take into account that MPs face strategic incentives to deliver speeches: Depending on the electoral system and the candidate selection process, MPs may either be inclined to demonstrate party loyalty or to build an independent profile ahead of elections (Hazan, 2014). Furthermore, Proksch and Slapin (2012, p. 522) have highlighted the centrality of intra-party politics and party control in the organisation of plenary floor debates, particularly in party-based systems: "To maintain the party's brand, party leaders must monitor their elected members and prevent them from undertaking activities that contradict the party's primary message." Accordingly, parliamentary party group leaders should be reluctant to allocate speaking time, which is a very scarce resource, to dissenting MPs.

3. Party Unity in the Context of EU Affairs

Before we direct our attention to the German parliament, it is important to discuss what we know about the particular challenges that EU matters pose to party unity at the domestic level. Issues related to European integration and immigration gave rise to a transnational cleavage, and the euro crisis in conjunction with the migration crisis was a critical juncture in this development. Historically, political parties in Europe have been established on the basis of the economic left/right division and the social libertarian/authoritarian divide, and they have been slow or even unable to adapt to the emergence of this new conflict dimension. As a result, party systems have witnessed the rise of challenger parties and dissent within mainstream parties (Edwards, 2009; Hooghe & Marks, 2017).

According to cleavage theory, conservative parties with a centrist position on European integration are

most prone to intra-party tensions because they support economic integration but are keen to defend national sovereignty and the nation state against further political integration and the sociocultural effects of transnationalism at the same time. Christian Democratic parties tend to fall in this category as well (Edwards, 2009; Marks & Wilson, 2000). This theoretical argument has been backed up by recent empirical evidence (Hobolt, 2016; Hooghe & Marks, 2017). National legislators might thus increasingly find themselves in a position in which they have to decide between party loyalty, on the one hand, and constituency interests or their personal conviction, on the other hand. However, contrary to conscience or value-driven issues (e.g., abortion rights or genetic modification) that also cause tensions particularly within Christian Democratic parties (Euchner & Preidel, 2017), the party whip is rarely lifted with regards to EU politics.

The Bundestag, the lower house of the German parliament, is a mixed-member legislature, in which 299 MPs are elected from single-member constituencies and the other half via regional party lists. In theory, this presents German legislators with different incentive structures based on their mandate and reelection strategy. In practice, empirical evidence has been inconclusive as to whether MPs holding a district mandate are less loyal to the party (Ohmura, 2014; Sieberer, 2010), but with regards to the domestic contention of the euro crisis, electoral mandate did not seem to have a significant impact on legislative behaviour (Bhattacharya & Papageorgiou, 2019; Degner & Leuffen, 2016). But other individual-level characteristics such as rank, experience and even gender seem to matter, and the exclusion of critical backbenchers, newcomers and women MPs from plenary debates on the future of the Economic and Monetary Union (Bhattacharya & Papageorgiou, 2019) carries implications for parliamentary discourses and political representation.

The debates on the Greek crisis provide an interesting case study, because Germany was the largest creditor country (contributing around 27% to the euro crisis measures) and public opinion was much more sceptical about granting Greece financial aid than the party positions in the Bundestag. Consistently, between 45% and 70% of citizens rejected the bailout programmes for Greece (see e.g., Forschungsgruppe Wahlen, 2010, 2012a, 2012b). In addition, public opinion polls (Forschungsgruppe Wahlen, 2011a, 2011b) suggest that in autumn 2011 every second citizen viewed the euro crisis as the most important political issue, but 4 out of 10 citizens either did not know which party best represented their interests in managing the crisis (28%) or felt that none of the parties did (14%).

In the absence of direct measures of intra-party preferences (i.e., party cohesion) and in light of the lack of scholarship on the inner workings of parliamentary party groups and the mechanisms through which their leaders impose discipline on their members and exercise control of floor time, the aim in this study is to shed new light on the significance of party control in legislative debate by drawing on multiple data sources and introducing DNA as a novel approach.

4. Discourse Network Analysis: A Novel Approach to Party Control and Unity

Analyses focussing on individual-level determinants of party unity have produced valuable insights, but they pay insufficient attention to the interconnectedness of individual activities and social relations. MPs' individual agency is both enabled and constrained by institutional provisions, party rules and norms (i.e., structure), and network analysis can provide new empirical insights into this structure/agency dynamic. Strikingly, network analysis has so far only been applied to analyse co-sponsorship in the U.S. Senate and Congress (e.g., Bratton & Rouse, 2011; Fowler, 2006). DNA can be used to examine actor coalitions from a discourse angle, and furthermore, the method allows us to look at claims through a network perspective in order to identify frames. This study employs DNA in the parliamentary setting as a novel approach to discursive unity within groups.

4.1. Data

Between 2010 and 2015, the Bundestag debated and voted on the Greek crisis five times (see Table 1). The time period of observation stretches over two legislative terms. As a result of the 2013 elections, the Free Democratic Party dropped out of the government and the Bundestag, and the Social Democrats left the opposition and joined Angela Merkel's Christian Democrats and their Bavarian sister party, the Christian Social Union, for a 'grand coalition' government. The dataset comprises 454 documents: 74 plenary speeches, 146 EoVs delivered by individual MPs and 234 joint EoVs. As the primary focus of this analysis is intra-party networks and agreement, it made most sense to code co-authored EoVs for each signatory, because if a group of MPs issue an EoV together, they all agree on the statements, and this information would be lost otherwise.

I imported the documents into the open-source software tool Discourse Network Analyzer (Leifeld, 2019), and I built the coding frame in an iterative process in which each document has been hand-coded at least twice. During the data cleaning stage, I removed all duplicates per document and ended up with 9,048 statements. Although not necessary for conducting DNA, in this original dataset, each individual MP's speech or EoV is stored in a separate document. Thus, one document contains only statements by the same MP, and several mentions of the same concept do not add any empirical value. I have coded all claims that express an opinion or preference with regards to (1) the causes, management or solution of the euro crisis, (2) the political actors involved, and (3) the wider institutional framework or political system(s) within which the MPs operate (examples

of highly contested concepts can be found in Figure 7). I identified 348 concepts and assigned each one to one of three categories:

- 'Policy' (N = 146) refers to the content of decision (past, present or future) and measures to solve problems. This category includes concepts related to the aid measures for Greece, other crisis measures adopted by the EU and Eurozone, proposals for financial regulation, austerity and fiscal consolidation. The most frequently mentioned 'policy' concepts were 'debt relief for Greece' (224 mentions), the 'conditionality of aid' and 'social fairness of aid' (each 189 mentions).
- 'Polity' (N = 93) is liberally used for references to structural, formal and institutional features of the political order and community. To give some examples, this category entails concepts about the political and economic order of the EU and the Economic and Monetary Union, Germany as a political system and EU member state, and institutional causes of the crisis. However, the most frequent claims concern 'solidarity with Greece' (116 mentions) and 'European solidarity' (103 mentions).
- 'Politics' (N = 109) describes the procedural aspects of decision-making. In this category, we find statements about the EU-level negotiations and crisis management of different actors, as well many party-political remarks and (rhetorical) arguments about the existence or lack of alternatives. Most commonly, MPs discussed the 'political will of Greek political actors' (215 mentions) and 'crisis management by the Troika' (129 mentions).

As discussed in the previous section, parliamentary party group leaders act as the gatekeepers to the plenary floor in the Bundestag. The more salient the debate, the more they try to ensure that speakers represent the party line. MPs who do not get an opportunity to speak but want to express their viewpoint or justify their voting decision can use EoVs as a channel of communication, and Table 1 illustrates that a considerable number of them have indeed done so.

4.2. Method

DNA was developed by Leifeld (2016, 2017) to combine qualitative text analysis with quantitative social network analysis, that is, a content-oriented method with an actor-centred approach, in order to examine the interactions and coalition-building activities of political actors through a discursive lens. So far the method has been used predominantly to understand and explain policy change by investigating coalitions between different kinds of political actor (such as political parties, non-government organisations, business representatives and other stakeholders) in public debates on pension policy (Leifeld, 2013, 2016), climate change (e.g., Fisher, Waggle, & Leifeld, 2013; Kukkonen et al., 2018) or the sugar tax (Buckton, Fergie, Leifeld, & Hilton, 2019). Most commonly, these studies used newspaper articles or other media content to gather stakeholders' statements. A couple of studies (Fisher, Leifeld, & Iwaki, 2013; Fisher, Waggle, & Leifeld, 2013) used DNA in the legislative context but focussed on the wider debate between parliamentary and non-parliamentary actors. To the best of my knowledge, this is the first systematic attempt to use DNA to study unity and coherence of legislative parties and actors.

I exported the raw data for data preparation, cleaning and analysis in Python. In the next step, I generated the actor congruence and conflict networks following the DNA manual (Leifeld, 2019). Congruence means that actors co-support or co-reject a concept, and in conflict networks, edges are counted when actors mention the same concept but their agreement, which is a dummy variable, differs. As I want to know whether two actors agree or disagree with each other overall, I used the subtract method (Leifeld, 2019, p. 7) to generate a new matrix in which "a tie weight between two actors is expressed as the number of concepts on which these actors have identical opinions minus the number of concepts on which these actors have diverging opinions" (Buckton et al., 2019, p. 3). From this matrix we can then generate subtract networks to visualise 'net' congruence (agreement in excess of disagreement) and 'net' conflict (disagreement in excess of agreement) in one graph. For the analysis of legislative debates, this is a useful tool for

Table 1. Overview of the documents in the dataset.

			EoVs	
Date	Debate	Speeches	Individual	Joint/MPs
07.05.2010	First aid programme for Greece	14	35	4/34
27.02.2012	Second aid programme for Greece	13	32	6/49
27.02.2015	Extension of second aid programme for Greece	12	51	9/86
17.07.2015	Government mandate for negotiations with Greece on third aid programme	18	1	6/49
19.08.2015	Third aid programme for Greece	17	27	3/16
	Total	74	146	28/234

assessing the degree and patterns of contestation. The potential bias of highly active actors is addressed by applying average normalisation to all 'net'-works and additional network analysis presented below. In order to improve the interpretation and visualisation of (less noisy) actor coalitions, a threshold value of 2 has been applied to network graphs and additional network analysis (except for modularity). Node sizes and edge widths reflect the degrees (i.e., number of connected edges) and edge weights, respectively. I have archived the dataset and code for public access (Bhattacharya, 2020).

I drew on a variety of social network statistics on the congruence relation to aid my interpretation of cohesion and contestation patterns over time and across groups. In order to detect communities of discursive similarity, I applied the Louvain method (Blondel, Guillaume, Lambiotte, & Lefebvre, 2008), which measures modularity, meaning the degree to which a network contains separate clusters. The analysis yields the number of partitions (i.e., communities) that gives the highest modularity score (i.e., closest to 1). To tap into cohesion, I applied the E-I index (Krackhardt & Stern, 1988), which measures the ratio of links with external actors to within-group links, giving a score between −1 and +1. As cohesion is associated with a dominance of internal ties over external ties, I swapped the plus and minus signs so that positive values indicate a higher density of internal connections. Another measure that captures cohesion is the Global Clustering Coefficient, which is the number of closed triplets of nodes over the total number of triplets. Thus, a high coefficient indicates coherence between legislators.

5. Inter- and Intra-Party Contention in Bundestag Debates on the Greek Crisis

The speaking time during plenary debates is allocated in accordance with the size of the parliamentary party group and of the government majority, and this is reflected in the number of statements made by each party in speeches. Christian Democratic MPs and the Greens were particularly active in using EoVs as a communication tool, while the Social Democrats communicated less after joining the government (see Appendices 1 and 2 of the Supplementary File). While more than half of statements are 'policy' claims, written explanations tend to be more 'policy'-centred and contain fewer statements on 'politics' than speeches. It is not surprising that (party) political contests are more central to plenary debates than EoVs. Table 2 reveals that the Christian Democrats and the Left are most concerned about 'policy' matters. The Greens focus least on 'policy' issues but most on 'politics.' The Free Democratic Party is the most active party with regards to 'polity' statements, which the Christian Democrats are least concerned about.

5.1. Channels of Contestation

Because floor time is the scarcest resource in the Bundestag and parliamentary party group leaders act as gatekeepers to the plenary floor, the number of speeches is low and it is questionable to what extent they provide an accurate depiction of the range of viewpoints and preferences present within legislative parties. As we would expect and as illustrated in Figure 1, plenary speeches on the Greek crisis reflect the government–opposition divide. Overall, speakers from the government parties co-support and co-reject many concepts, and when the Social Democrats became part of the government (debate 3–5), they became more congruent with the Christian Democrats and assumed a middle position between the Christian Democrats and the Christian Social Union, on one side, and the Left and Greens, on the other side. We rarely see conflict between government actors, and when we do, it usually involves those 'rebels' (marked with R) that were allocated extra floor time by the President of the Bundestag. When executive actors, such as the Chancellor (C), Finance Minister (Fi), Foreign Minister (Fo) or Minister for Economic Affairs (Ec) appeared on the floor, they did not attract more dissent than other majority speakers. The leader of the Bavarian Christian Social Union (blue L) has often been one of the more central actors in the government coalition, while the leader of the Christian Democratic group (grey L) addressed some of the concerns of more critical backbenchers within the party in the last two debates and therefore takes a more peripheral position. The analysis of modularity (Figure 3) confirms that contestation on the plenary floor has constantly clustered into two coalitions over the five-year period.

Table 2. Statement frequency by party and concept category.

	Policy		Polity		Politics		
Party	N	%	N	%	N	%	Total
Christian Democrats	1,722	58.0	375	12.6	871	29.3	2,968
Christian Social Union	255	50.9	84	16.8	162	32.3	501
Social Democrats	978	48.9	408	20.4	612	30.6	1,998
Free Democratic Party	175	50.3	84	24.1	89	25.6	348
Left	629	54.9	208	18.2	309	27.0	1,146
Greens	975	46.7	436	20.9	676	32.4	2,087
Total	4,734	52.3	1,595	17.6	2,719	30.1	9,048

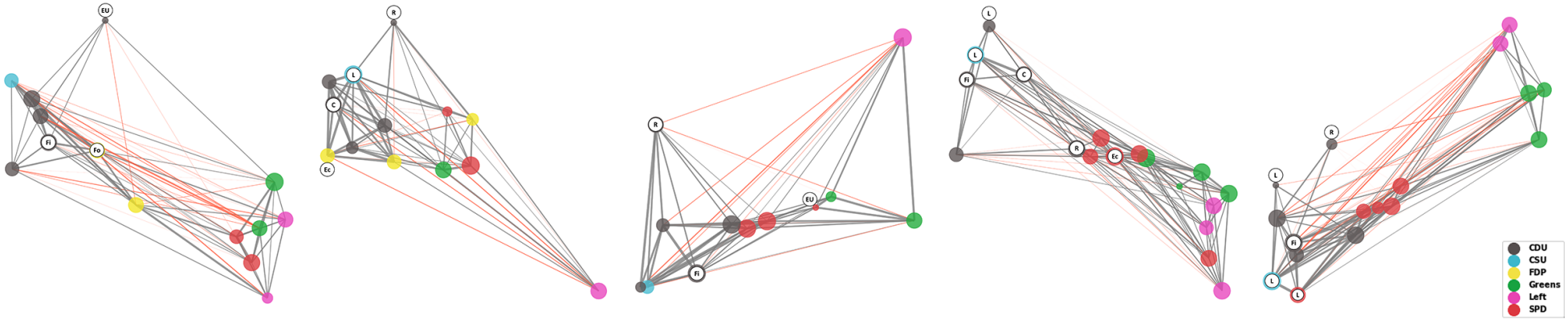

Figure 1. Actor subtract networks for speeches in chronological order (left to right). Notes: Congruence ties are grey and conflict ties are red. Some key actors have been marked.

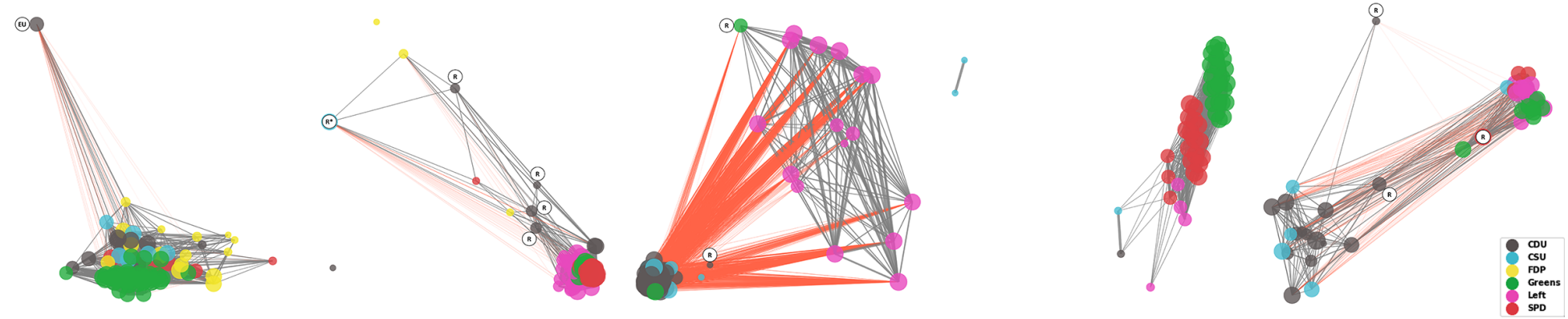

Figure 2. Actor subtract networks for EoVs in chronological order (left to right). Notes: Congruence ties are grey and conflict ties are red. Some key actors have been marked.

If we look at contestation patterns in EoVs in Figure 2, the most striking observations are that (1) more actors are involved, that (2) although there are distinct coalitions, they cannot be easily explained by the government–opposition divide. The findings from Figure 3 also highlight that EoVs are clustered into three groups, which became more internally cohesive from the third debate onwards. The networks indicate relatively high levels of cohesion for the Greens and the Left, both of which were in opposition during the entire period. Both Figure 1 and 2 suggest that the Left Party has conflictual relations with all parties. Contrary to plenary speeches, EoVs from the Social Democrats are more congruent with those from the opposition than the government parties also after joining the government coalition in 2013. Those MPs who diverge most from their party colleagues are often 'rebels' (R) who voted against the party line, future rebels (R*) or members of the EU Affairs Committee (EU).

5.2. Party-Level Dynamics and the Government–Opposition Divide

In this section, I explore the cohesiveness of government coalition and opposition parties across different communication channels further by presenting two relevant network statistics that tell us more about the unity of groups identified in the network. First, I use the E-I index, which captures how many ties a parliamentary party group or the government/opposition parties have with external MPs in relation to internal connections. Second, another indicator of internal unity is the Global Clustering Coefficient, which measures the density of ties within a group, in other words, the extent to which members of a group mention and agree on the same concepts.

Figure 4 illustrates that government parties appeared much more united on the plenary floor. In fact, the opposition often displayed more ties with the government majority than internal ties. But we see a very different picture for EoVs: Statements by opposition MPs tend to display higher unity than those from the government majority. The only exception is the third debate, in which almost a quarter of MPs from the Christian Democrats and the Christian Social Union, but none from the Social Democrats, issued an EoV. These findings highlight that for the government coalition it is more important to display a united front and send a coherent message in plenary debates. Since government parties are not necessarily more cohesive, their leaders need to exercise tight control over speechmaking.

At the party level (see Figure 5), we find that parties generally have a lot of external links, which indicates that there is a shared understanding on some issues. Furthermore, there appears to be a correlation between the number of actors and the E-I index: Agreement within a party becomes more visible if their MPs communicate more. However, it would also be plausible to assume that internal dissent rises as well, and the insights from clustering analysis suggest indeed that having more internal than external connections does not automatically constitute party unity. If we compare the Global Clustering Coefficient across parties, we find that the Christian Democrats display lower discursive coherence than the Social Democrats and the Greens, even though the E-I indices did not point to such a pattern. In the next section, I take a closer look at intra-party contestation among Christian Democrats and Christian Social Union MPs to gain a better understanding of the multifaceted phenomenon of party unity.

5.3. Christian Democrats in Disunity?

The Christian Democrats are not only the largest parliamentary party group but in theory, also the party that is

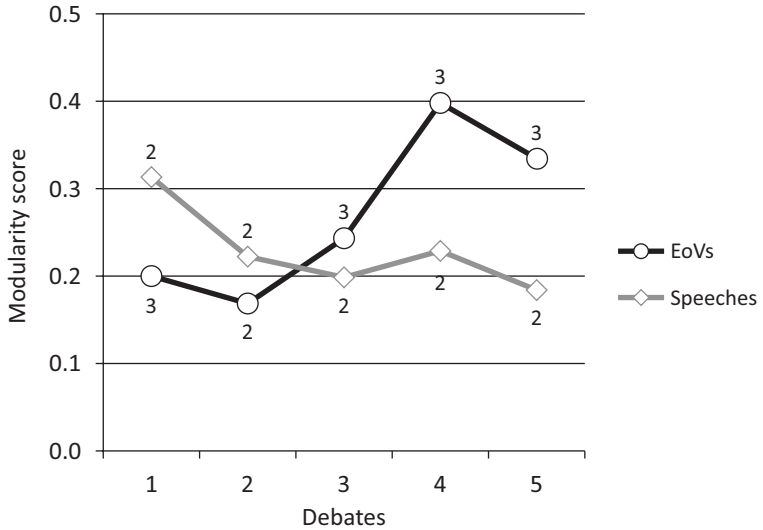

Figure 3. Louvain modularity scores for actor congruence networks for speeches and EoVs. Notes: The labels indicate the number of partitions.

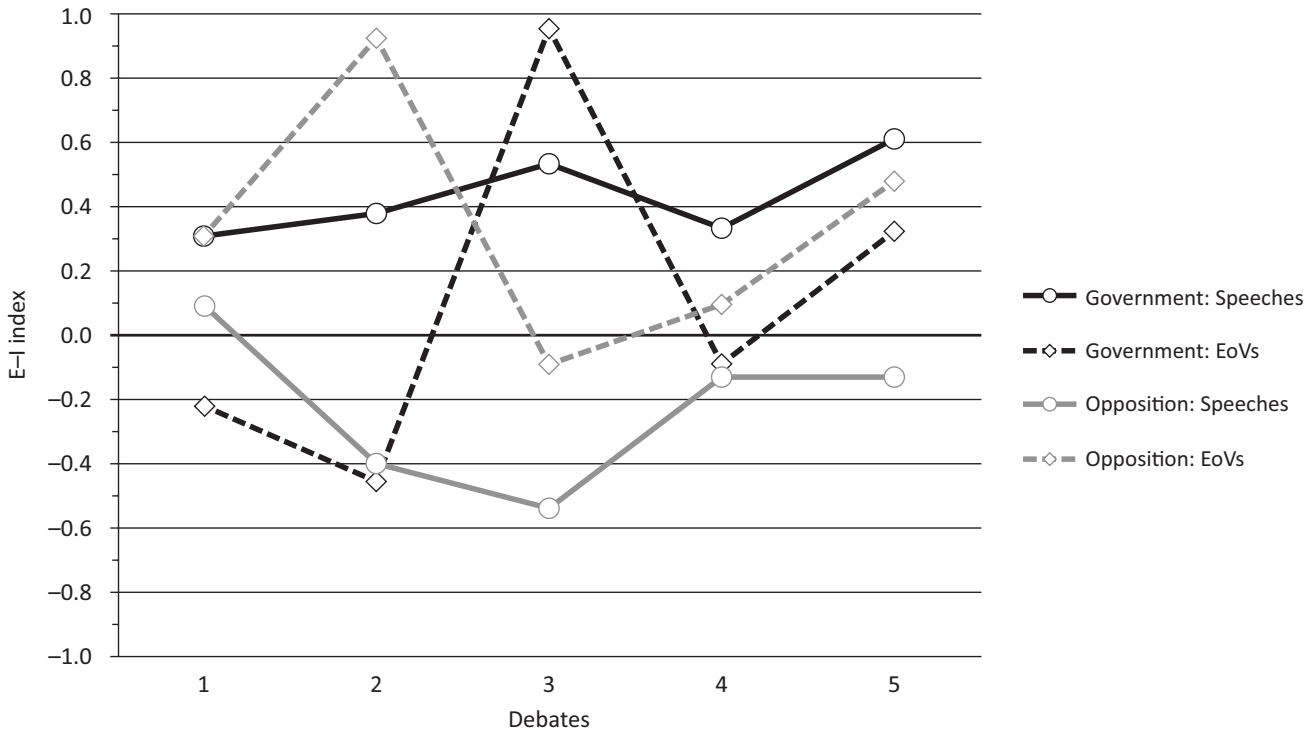

Figure 4. E-I index for speeches and EoVs by the government coalition and opposition parties. Notes: Plus and minus signs have been swapped so that higher values indicate more internal than external ties.

most vulnerable to intra-party dissent. Voting unity has gradually declined over the period of observation. In the fourth and fifth debates, almost one-third of MPs voted against the party line. This is very unusual for a government party and received a lot of media attention at the time. Interestingly, Figure 6 shows that intra-party dissent was highest in the second debate, when the number of dissenters was still relatively small, and the last debate, but as discussed above, this hardly became visible on the plenary floor, because only one dissenter was allowed to speak (and not by his own party). Elsewhere we show that not only are MPs who cast a deviant vote much more likely to defect in the subsequent vote, but those MPs who issued an EoV are also more likely to defect, though less likely to deliver a statement, in the next debate (Bhattacharya & Papageorgiou, 2019, pp. 438–440). In other words, MPs who have once explained their deviant voting behaviour or issued a critical statement despite voting with the party do not keep issuing dissenting statements. This would explain why (1) despite declining voting unity, conflict does not steadily increase in the party's parliamentary communication, and why (2) party rebels (R) belonged to the most central actors especially in the earlier debates.

A detailed content analysis of the debates is beyond the scope of this study, but I have presented an overview of the concepts that were most disputed among the Christian Democrats. I have ranked all the concepts that have been mentioned at least once in both a positive and negative way using a score that measures contestedness:

$$S_c = \sqrt[3]{\left(1 - \frac{|a_c - d_c|}{a_c + d_c}\right) \times \frac{a_c + d_c}{D_{\max}(a_i + d_i)} \times \times \frac{\min(a_c,\ d_c)}{\min(D_{\max}(a_i),\ D_{\max}(d_i))}}$$

The contestedness score (S_c) is computed by multiplying the normalised scores of the following three factors: (1) closeness, meaning the balance between positive and negative mentions, (2) salience, i.e., how often the concept has been mentioned within the debate in relative terms, and (3) minimum salience ratio, which takes the smaller frequency (i.e., either agreement or disagreement) of the concept and compares it with the maximum frequency in the debate. The last factor is included to give more importance to frequently-mentioned concepts. Cube root transformation has been applied to reduce left skewness. a_c and d_c denote the frequency of agreement and disagreement with the concept respectively, while $D_{\max}$ is the maximum frequency for agreement (a_i) or disagreement (d_i) across the dataset. The range of each factor is between 0 and 1, and therefore the overall score is also between 0 and 1.

The top five concepts for each debate are presented in Figure 7. The first observation is that dissent within the Christian Democrats and the Christian Social Union occurred predominantly with regards to 'policy' and 'politics' claims. Critical backbenchers questioned whether the aid programmes comply with EU law and would accomplish their objectives, and in later debates whether they have proved to be successful in creating economic

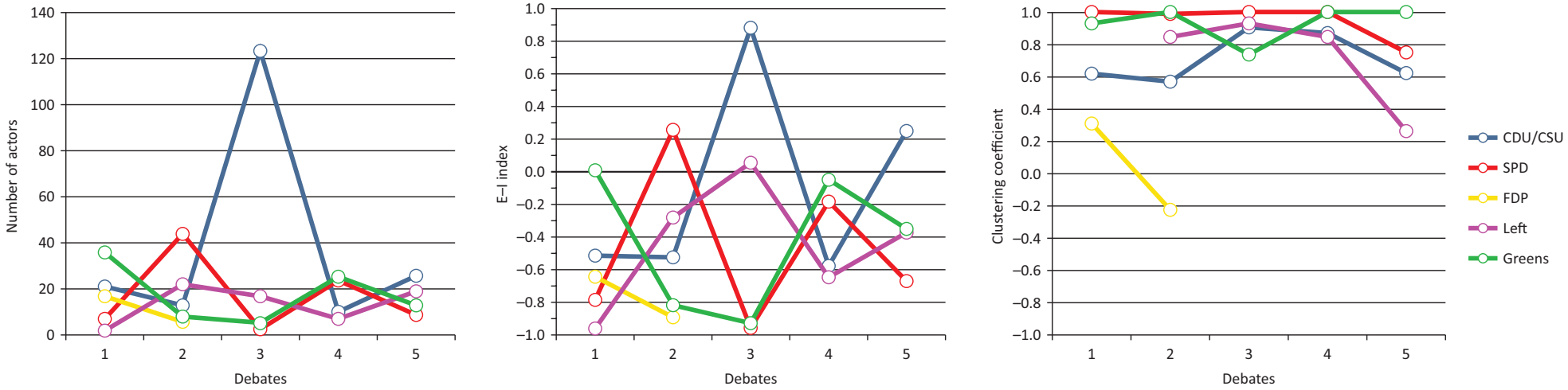

Figure 5. Number of actors (left), E–I index (centre) and Global Clustering Coefficient (right) for each party.

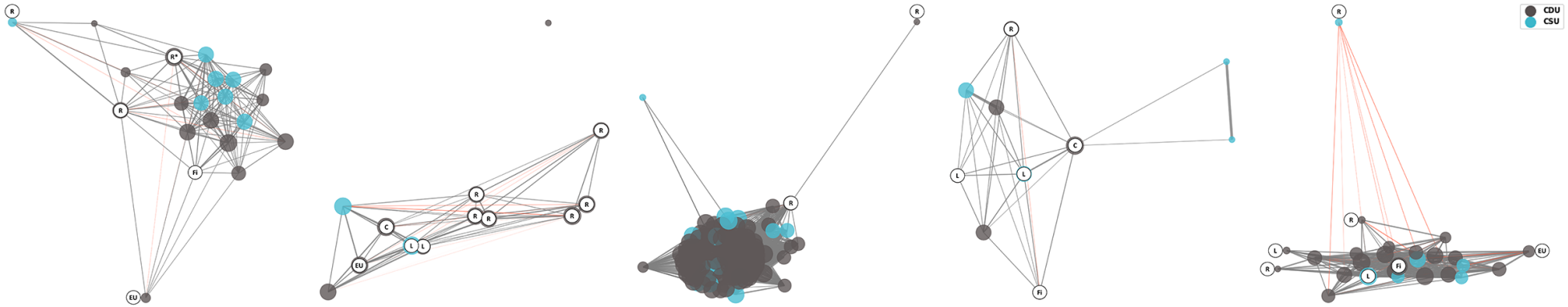

Figure 6. Actor subtract networks for the Christian Democrats/Christian Social Union in chronological order (left to right). Notes: Some key actors have been marked.

Figure 7. Most contested concepts in the Christian Democrats/Christian Social Union by debate. Notes: The bar color indicates whether the concept belongs to the 'policy' (green), 'polity' (blue) or 'politics' (orange) category.

growth in Greece. With regards to politics, most disagreement revolved around the question of whether the political decision-makers in Greece demonstrated enough political will or not. On the 'polity' dimension, there was no open dissent regarding the EU's political order. However, Chancellor Angela Merkel's mantra 'there is no alternative' (to the bailout programmes) has consistently been challenged, and backbenchers began to talk about Greece potentially leaving the Eurozone, voluntarily or not, before the Finance Minister publicly discussed the 'Grexit' option. For many observers, the Euro Summit on 12–13 July 2015 marked a turning point in Germany's pro-European commitment and consensus in mainstream politics. Jürgen Habermas (Oltermann, 2015) said:

> When finance minister Schaeuble threatened Greek exit from the euro…the German government…made for the first time a manifest claim for German hegemony in Europe…and have gambled away in one night all the political capital that a better Germany had accumulated in half a century.

This analysis illustrates that this was not merely a single-handed, tactical move by Schäuble, but can also be interpreted as an expression of a wider sentiment in his party against a 'transfer union' and more political integration.

6. Conclusion

The main objective of this study was to demonstrate why party control of speechmaking is key to understanding the unity of parliamentary party groups and of government vs. opposition parties as observed on the plenary floor. In order to advance the scholarship on party

unity as a dynamic and multidimensional phenomenon, we need to think of underexplored data sources and innovative methodological approaches to add a discursive angle to the literature. This article introduces DNA as a novel approach to discursive party unity. DNA helps us to bridge the "gap between content-oriented and actor-centred approaches to political discourse" (Leifeld & Haunss, 2010, p. 4) by tapping into the interconnectedness of individual speech acts and allowing us to explain and visualise changes in public discourses through shifts in actor constellations. So far DNA has been used predominantly for studying coalition building between political organisations and stakeholders through media content analysis, but here I demonstrate that it is well suited also for the analysis of coherence *within* political organisations and groups. This study illustrates how DNA, complemented by additional social network measures, can be used in the parliamentary context to examine inter- and intra-party contestation and changes in discursive coherence within groups over time.

In highly salient debates, especially government parties exercise tight control over floor time to convey a unified message. Government representatives, parliamentary party group leaders and experts on budgetary and financial affairs have dominated plenary debates on the Greek crisis in the German Bundestag. This analysis highlights how critical backbenchers and EU experts have challenged discursive party unity through written statements, known as EoVs. While EoVs seem to be a particularity of the Bundestag, the Portuguese parliament (Leston-Bandeira, 2009) and the European Parliament, with some creativity we should be able to find equivalent data sources in other legislatures. Such data sources could be any type of individual communication found from MPs' committee work, press interviews, press releases, personal websites or social media. This would certainly be a worthwhile endeavour, as we need to advance our understanding of the effects of party control and parliamentary rules and procedures on political discourse.

Acknowledgments

I would like to extend my gratitude to Sourav Bhattacharya for his technical support with Python. I thank Philip Leifeld and two anonymous reviewers for their valuable comments that have helped me to improve the quality of this work. I am also grateful to Tero Erkkilä and Hanna Wass for their guidance during this research project, and to Tuomas Ylä-Anttila and Anna Kukkonen for methodological advice. This research was funded by the Finnish Cultural Foundation and the Doctoral Programme in Political, Societal and Regional Change at the University of Helsinki.

Conflict of Interests

The author declares no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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COGITATIO

Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 243–256
DOI: 10.17645/pag.v8i2.2605

Article

Us vs. Them as Structural Equivalence: Analysing Nationalist Discourse Networks in the Georgian Print Media

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Submitted: 31 October 2019 | Accepted: 20 March 2020 | Published: 2 June 2020

Abstract
Nationalist discourse has been identified as a driving factor in the causal chain linking democratization to the likelihood of ethnic conflicts, due to its nature of polarizing *us* against *others* along ethnic lines. However, we lack systematic knowledge of the structure and dynamics of this polarization. Adding to the established practices of analysing in-group/out-group divisions in ideological and political discourses, this article proposes an innovative way of measuring the divisiveness of nationalist discourse using social network analysis. Instead of looking at direct nationalist interaction between actors, deeper discursive structures are found by analysing indirect relationships across actors, based on their nationalist interaction with third parties. In this manner, it is possible to identify whether certain actors form structurally similar clusters, based on whom they direct their nationalist appeals to, how intense these appeals are towards specific actors, and what other groups they are targeted by themselves. By applying the measure of Structural Equivalence to the original data on nationalist appeals obtained from the quantitative content analysis of the Georgian print media across the 20 years of its democratization (1991–2012), this article shows that the actor structure of nationalist discourse conveys information on group polarization. Further, it demonstrates that the divisiveness of this discourse in Georgia became sharper during electoral periods, with the first two elections after independence being particularly dangerous in this regard.

Keywords
democratization; discourse network analysis; Georgia; nationalism; polarization; print media; structural equivalence

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis," edited by Philip Leifeld (University of Essex, UK).

1. Introduction

Conflict researchers, who have found evidence that electoral periods in democratizing countries increase the risks of violent conflicts, identify nationalist discourse in media as a major mechanism driving the causal process between the two variables (Cederman, Gleditsch, & Hug, 2013; Mansfield & Snyder, 2005; Snyder, 2000). According to this argument, relative liberalization of the public sphere, and an increasing degree of political participation in post-authoritarian states, incentivize both old and new actors to mobilize resources—including their control of media—to win mass support. Carrying the legacies of authoritarian political culture, these actors do not have strong policy platforms they can rely on. Therefore, nationalism becomes the "universal" category to appeal to (Snyder & Ballentine, 1996). But, apart from creating feelings of cohesion within the members of a national in-group, appealing to national sentiments also risks creating aversion towards the national or ethnic 'others.' Whether targeting groups within or beyond state borders, these appeals are particularly dangerous if saturated with hostile references. It is in these circumstances that nationalist polarization between *us* and *them* occurs, which can contribute to conflict escalation under the conditions of weak political institutions in democratizing countries (Cederman, Hug, & Wenger, 2008; Mansfield & Snyder, 1995).

Despite focusing extensively on the importance of nationalist discourse, this strand of the literature offers little systematic knowledge about its structure and dynamics. As a result, we also lack empirical evidence suggest-

ing the intensification of divisive nationalist discourse during electoral periods. Based on an analysis of the print media of Georgia—a typical case of democratization and conflict—this article addresses the problem by identifying empirically if, how and when the nationalist discourse in media is at its most divisive.

To this end, taking the structural perspective and extending on the methodology of discourse network analysis (Leifeld & Haunss, 2012), nationalist discourse is conceived in this article as a social network wherein actors are engaged in nationalist interaction, i.e., sending, and targeted by, nationalist appeals. This proposition, which relies on the approach to the study of nationalist discourse by Abzianidze (2020), implies an innovative way of conceptualizing and measuring the in-group/out-group structure of this discourse, based on the structural similarities and differences of the actors sending nationalist appeals to, and receiving them from, the same other actors. Rather than simply focusing on dyadic interaction between actors, my approach is to bring in third parties and look at the indirect relations between two actors involved in the nationalist discourse, based on the patterns of their interaction with these third parties. In network analytic terms, this implies using the method of structural equivalence analysis to tease out the hidden structures of nationalist discourse networks.

2. 'Us' vs. 'Them' in Political and Ideological Discourses: Established Practices

The general nature of the intergroup relationship has been identified and largely discussed by the social psychological literature (e.g., Hogg & Abrams, 1998; Tajfel & Turner, 1986). While the latter is mostly focused on behavioural aspects of intergroup relations, Billig (2009) has emphasized the roles of text and talk in the reproduction of group identities. Critical discourse analysts have further studied patterns of ideological reproduction by embedding the social psychological understanding of intergroup relations in discourse analytic theories and methods (Fairclough, 1995; Wodak, de Cillia, Reisigl, & Liebhart, 2009). These studies mostly focus on, for example, references to pronouns, such as 'us,' 'them,' 'we,' 'they,' or to other deictic words such as 'here,' 'there,' etc. Also, by deconstructing a text content qualitatively, they try to link discourse structures to power structures (van Dijk, 1993, 2012). While all of these studies acknowledge the importance of the actors, few of them, if any, analyse systematically the actor structure of the discourse, which leaves patterns of actor interaction in the nationalist discourse understudied.

More recent studies of political discourses have addressed these challenges by extending the scope of the material analysed, both in terms of its amount and the information coded, thus allowing more formalized analyses over time. Particularly important in this regard is the research on political claims analysis (Koopmans & Statham, 1999), which combines the quantitative rigor of protest event analysis with the qualitative depth of political discourse analysis. However, the relational aspects between senders and addressees of claims, and the resulting discourse structures, have not been greatly explored, apart from work on the debates around EU enlargement by Adam (2007). To address the lack of attention to the relational properties of political discourses, Leifeld (2017) suggested the discourse network analysis methodology, which combines the structural depth of critical discourse analysis and a more formalized social network analysis. It employs the methodological toolbox for a systematic analysis of the discursive interaction of actors based on the concepts they refer to, and the stance they take towards issues in a policy domain. Thus, it allows the identification of the discourse coalitions in policy debates, and the analysis of patterns of discursive interaction within and between those coalitions.

While this strand of the literature has substantially advanced the systematic study of the relational structures of political discourses, its application to nationalist discourse and, especially, its divisiveness, can be limited. The reason for this is that policy discourse is a debate in its own right, wherein different actors might take different stances towards different issues. Yet nationalist discourse is more a discourse of hegemony rather than a debate. It is clear that, within this discourse, members of ethnic and/or national groups will always take the stance in favour of their own groups, whatever the issue concerned. Therefore, with the purpose of identifying the cleavage of the ethno-national 'self' against the 'other' in the discourse, this article demonstrates how the methodology of discourse network analysis can be extended from using it for studying policy debates to its utilization for ideological discourses such as nationalism.

3. New Prospects for Analysing Nationalist Discourse

In this study, nationalism is defined as a "doctrine that people who see themselves as distinct in their culture, history, institutions, or principles should rule themselves in a political system that expresses and protects those distinctive characteristics" (Snyder, 2000, p. 23). It is a way of speaking about a nation, its boundaries, interests, and aspirations (Brennan, 1990; Calhoun, 1997), thus, manifested in both text and talk (van Dijk, 1998, p. 193). Divisiveness is characteristic for the nationalist discourse, just as it is the case with other ideological discourses (e.g., populist discourse). The major source of this divisiveness is the emphasis on the distinction between the in-group (us) and the out-group (them). Typical to this emphasis is the expression of in-group affinity and distrust, or sometimes even hostility and hate, towards an out-group. The latter can frequently result in the expressed desire to exclude the members of this out-group from certain rights or resources. In this way, groups manage to reaffirm their in-group cohesiveness and thus ensure the constant re-production of their national identities. Although, frequently, it is not the open and con-

frontational "flag-waving" version of nationalism, but rather the everyday "banal" form that constitutes the reproduction of national belonging (Billig, 1995). The banality of it lies in the fact that these expressions of nationalism mostly remain unnoticed—for example, a flag on a country's parliament building, which is rarely noticed by passer-by citizens. Discursive manifestations of this banal nationalism are not benign, either. The everyday usage of such banal words as 'us,' 'them,' 'we,' or 'they,' as well as that of deictic expressions, such as 'here,' 'there,' or 'now,' can enhance the process of nationalist re-production (Billig, 1995, pp. 93–127). I argue that there is yet another, so far undiscovered, manifestation of banal nationalism hidden in the actor structure of the discourse.

3.1. Theoretical Logic of the Argument

This article argues that if members of an in-group make repetitive negative statements towards the same out-group(s), so that these members are aware of each other's statements, it can strengthen the bonds within the in-group members vis-à-vis that/those out-group(s). Applying this logic to the nationalist discourse means that when different members of a nation or an ethnic group repeatedly make nationalist statements publicly, and direct those statements towards the same other groups, it can, on the one hand, intensify the feeling of in-group cohesion, and on the other hand, aggravate the aversion towards the respective out-groups. In times of nation-building, political and social actors who have access to the public sphere, and who need to legitimize their position as part of the elite, respond to the group prototypicality demands by setting and/or enhancing the boundaries of their in-group and delimitating it from everybody else (van Knippenberg, 2011). In this process, some out-groups might be addressed in a neutral way, while others can be represented as existential threats to the group self-continuity, and thus be portrayed as enemies (Sani, Herrera, & Bowe, 2009). When we talk about the re-production of the in-group cohesion through the nationalist discourse, the exact content of their nationalist appeals, and how actors address each other, is certainly of great importance. However, by focusing on dyadic interactions between actors, we might be missing deeper structures of the discourse, which can have a strong impact on in-group cohesion.

Instead, I propose to understand and, thus, operationalize the structure of 'us' vs. 'them' in the nationalist discourse in terms of the groups of structurally equivalent actors. This implies shifting our attention from who attacks whom to what relationships actors have with each other, based on their interaction with other actors. More specifically, actors involved in the nationalist discourse might not have direct relationships with each other (i.e., sending statements to each other, in this case), but they can be linked indirectly through the patterns of their interaction with third parties. These indirect relations can be defined by the similarity (or dissimilarity) of actors in whom they target their nationalist appeals at, in how intensive their appeals are towards specific addressees, as well as in being targeted by the same other actors.

Nationalist discourse in the present study is constituted of instances of appealing to exclusion or expressing hostility, whereby at least two different ethnic or national groups are concerned. Therefore, drawing on the work by Maoz, Kuperman, Terris and Talmud (2006), we can think of this similarity as the structural affinity among actors involved in the nationalist discourse—i.e., actors who are structurally similar in sending nationalist appeals to and receiving them from the same other actors form the group, members of which share the same (in this case, exclusionary/hostile) attitudes towards the groups that are structurally dissimilar from them. At the same time, if we have the information on the ethnic and/or national attribution of the actors to be analysed, we can also find out if the clustering patterns of these groups follow ethno-national lines and, thus, form ethnic/national in-groups against out-groups. In this way, we will be able to tease out the 'us' vs. 'them' structure of the nationalist discourse systematically.

The graphical representation of this argument can help us to understand its logic better. Figure 1. presents confrontational discursive interaction between actors representing three hypothetical groups labelled as A, B, and C. Members of group A (a_2 and a_{11}) are structurally similar because, on the one hand, they make confrontational statements against the members of the same other groups, in this case c_1 and b_2, and, on the other hand, are themselves targeted by the same other actors. Actors c_1 and b_2 are structurally similar as well in that they share patters of interaction with other actors; however, they are dissimilar from a_2 and a_{11}. In this way, the structurally similar actors a_2–a_{11} and c_1–b_2 form two different clusters. If this type of confrontational interaction occurs repeatedly in a public arena, it can strengthen the bonds between a_2 and a_{11}, as well as between c_1 and b_2. Even more importantly, it can exacerbate the polarization between these two clusters (i.e., a_2–a_{11} and c_1–b_2).

It is then the goal of the empirical analysis to identify whether the data on nationalist appeals collected from the Georgian print media in 1991–2012 yield the groups of structurally similar and dissimilar actors, and, if this is the case, what lines these group divisions follow—are the clusters of structurally similar actors in the discourse divided along ethno-national lines?

3.2. Nationalist Polarization between 'Us' vs. 'Them' and Elections

Embedding these theoretical propositions back to the election–nationalism–conflict nexus is instrumental to improve our understanding of the relationship between elections and the divisiveness of nationalist discourse. Both large-N studies, as well as case studies which find

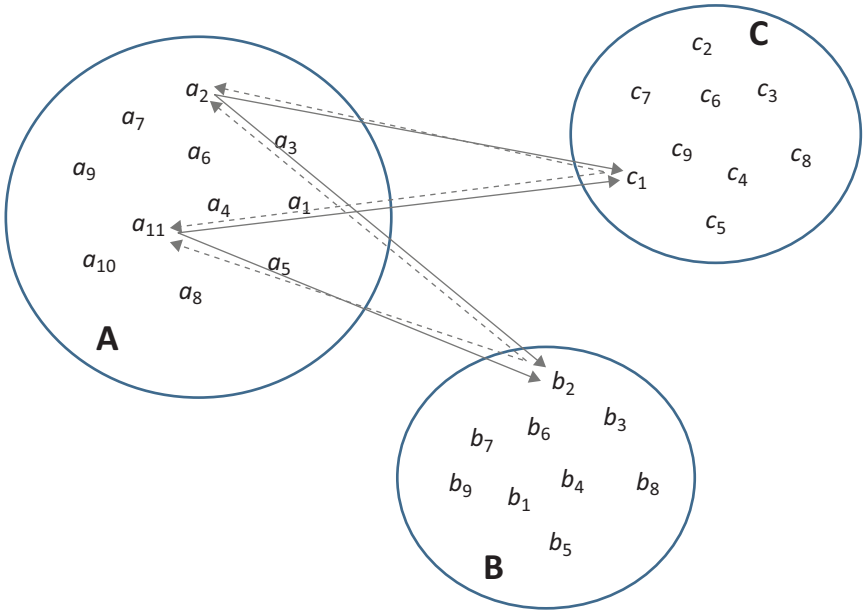

Figure 1. Network of confrontational discourse among the hypothetical groups, a graphical representation of the argument. Notes: Capital letters stand as labels for hypothetical groups, while the respective lowercase letters represent members of these groups.

that electoral periods are associated with the increased likelihood of violent conflicts, assume that nationalist discourse intensifies during these times (Cederman et al., 2013; Mansfield & Snyder, 2005; Snyder, 2000). Their theoretical argument builds on the peculiarities of political competition in newly emerged states that have embarked on the path of democratic transition. Unlike in mature democratic countries, where losing elections might merely mean waiting for another try in the next round of elections, here the costs can be much higher for politicians. Losers might face not only marginalization from political power but also oppression. Conversely, given the level of centralization in these countries, winning elections usually implies obtaining near unlimited access not only to political power, but also to the economic resources and coercive forces of a country. These high election stakes and the resulting potential threats can push actors involved in the political competition on either side to instigate violence (Höglund, Jarstad, & Kovacs, 2009; Wilkinson, 2004). During electoral periods, political and military actors frequently resort to confrontational, exclusionary, and divisive nationalist rhetoric (Mansfield & Snyder, 2009). Given these propositions, I expect that the 'us' and 'them' polarization in the nationalist discourse present in the Georgian print media of 1991–2012 will be stronger during electoral periods as compared to non-electoral years.

In addition, the first two competitive democratic elections have been identified as the most dangerous, in terms of the likelihood of violent conflicts (Cederman et al., 2013). Actors are supposed to be the most radical during these times due to the uncertainty of the situation (Brancati & Snyder, 2013; Reilly, 2002). These propositions lead me to expect that the divisiveness of the nationalist discourse between the in-group and the out-group should be stronger during the elections at the beginning of the democratization period (i.e., early elections), compared to those taking place later in the period (i.e., late elections).

4. The Story of 'Us' vs. 'Them' in Georgia

Georgia declared independence in 1991 after nearly 70 years of being part of the Soviet Union. Before then, Georgia experienced only three years of being an independent republic, between 1918 and 1921. Therefore, when, after the dissolution of the Soviet Union, Georgia became independent and embarked on the path of democratization, questions were wide open regarding what constituted the nation, who was part of it and who not, and, maybe most importantly, how the ethnic understanding of 'Georgianness' could be coupled with the multi-ethnic reality of the Georgian state. Elites, who had the access to the public sphere, faced the task of defining the boundaries of the Georgian nation and that of delimitating it from everybody else (all the out-groups), thereby identifying who posed a threat to the well-being of the in-group and which other groups could be perceived as friends. This process did not start with the declaration of independence, but instead had begun more than a decade before when the Georgian National Independence movement gained momentum. Already in the 1970s, a group of literati from academia and the cultural intelligentsia launched an intellectual effort to define 'the Georgians' by recalling the glorious past of the nation, identifying its 'spiritual missions,' as well as laying out its political interest of self-determination and ways in which it could develop into a future democratic

state. Ethnicity was the central defining category here. Obviously, part of the process was to label other ethnic groups and nations in relation to the in-group. The number one enemy of the nation at that time was clear (the Soviet Union), and independence was equated with the existence of the nation. These ideas, gradually trickling down to the general public, gained massive importance by the end of 1980s, with the relative opening of the public sphere in the perestroika era.

The more realistic the prospect of the dissolution of the Soviet bloc became, the more the range of out-groups was diversified. First, as the legal successor of the Soviet Union and the one holding back Georgian independence, sometimes even with the use of the force, Russia was evolving into the enemy, as it was the major threat to the self-continuity of the in-group. Second, emerging tensions with the ethnic groups residing in the autonomous regions within the Soviet Socialist Republic of Georgia and demanding independence from the Georgian state, created another stratum of out-groups—Abkhazians and South Ossetians—who threatened 'our' political interests, inasmuch as 'their' demands for independence intimidated the in-group's understanding of its territorial integrity. Related to this, Armenian and Azerbaijanian ethnic minorities residing in Georgia also began to be perceived as a potential threat, in part due to the fear of a potential repetition of the Abkhazian and South Ossetian scenarios. Several factors might explain why these fears emerged towards these and no other minorities living in the country: These two groups were (and still are) the largest ethnic minorities, territorially concentrated in two different regions of Georgia; they both were linguistically and religiously different from Georgians; and, more importantly, both of these groups had kin-states that, similar to Georgia, at the time were undergoing the process of nation-building as well as political self-determination, which implied defining national and territorial borders in relation to 'others.'

Third, already in its initial phase, the Georgian National Independence movement had defined the new orientation of the emerging state as Western democratic; therefore, the hope was that the countries of Europe and the USA would stand by the in-group in its fight for independence and a democratic future. However, an emphasis on the uniqueness and particularity of Georgian culture and traditions, and its difference from Western cultures (and others), were not uncommon either. Last but not least, becoming an independent state also implied the definition of the in-group´s relations with all the other states on the international arena.

It must be taken into consideration that the process of nation-building in Georgia was accompanied with complex political dynamics during the period under study (1991–2012). Right after the dissolution of the Soviet Union, three conflicts erupted almost simultaneously—a governmental conflict that led to a coup d'état (December 1991–January 1992), and two ethno-territorial wars in the autonomous regions of Abkhazia and South Ossetia (1990–1993). After nearly a decade of 'frozen' conflicts, 2008 marked the outbreak of a new wave of violence. While Russian interests and its involvement in the wars of the early 1990s was obvious, the war of 2008 turned into an explicit interstate armed conflict between Georgia and Russia. The so called August War in 2008 resulted in the recognition of Abkhazia and South Ossetia as independent states by Russia.

In light with these tensions within and beyond state borders, appealing to nationalist sentiments has not been unknown for political contestation in Georgia. The first president of Georgia, Zviad Gamsakhurdia, for example, frequently referred to the idealization of past glories of the Georgian nation (Jones, 2013, pp. 51–74). As Wheatley (2005, pp. 51–63) argues, Gamsakhurdia was able to exploit the existing fears of Georgian citizens by portraying ethnic minorities as a 'fifth column' acting in Russia's interests. Labelling political opposition, or any other opponent, as an 'agent of KGB,' 'the enemy of the nation,' 'the traitor,' etc., was also not uncommon in Gamsakhurdia's speeches. Some authors also attribute the escalation of violence in the region of Abkhazia to the local power struggles within the State Council of Georgia (the former Military Council) between the warlords and Eduard Shevardnadze, the Head of the Council at that time and future President of the country (Jones, 2013, p. 95; Nodia, 1998, p. 34; Wheatley, 2005, p. 70). This pattern of utilizing nationalist discourse in political competition has persisted even after the Rose Revolution, which brought to power young reformers led by President Saakashvili. Nationalism under Saakashvili's government showed some diversionary tendencies, i.e., constantly emphasizing the threat Georgia faced from Russia, and frequently using these threats to de-legitimize opposition within the country. Perhaps, the most vivid example of this was a fake news report about the start of the war that aired on the TV channel, Imedi, during primetime on March 13th, 2010. It was widely believed that Imedi was controlled by the government, partly because of its openly pro-government bias, and due to the fact that the broadcaster was run by Giorgi Arveladze, a long-time ally of Saakashvili and a former member of his party and cabinet. The 30-minute fake news report suggested that Russian troops were invading the capital of Georgia, and went so far as to report the assassination of President Saakashvili, all of which sparked mass panic across the country. One of the main messages transmitted by the report was that the leaders of the Georgian political opposition were supporting and legitimizing the Russian intervention. After the report, the television anchor said that its aim was to show what could happen, subtly pointing to the threats opposition posed to the country ("Fake report on renewed war," 2010; Mtivlishvili, 2010).

Bearing in mind this background information about the nation-building process and political struggles that took place in Georgia across the period of its democratization between 1991–2012, the major goal of the study

is to identify whether and how this nationalist divisiveness was reflected in the structures of the discourse.

5. Data and Method

The analysis in this article relies entirely on the original data on nationalist appeals collected during an extensive content analysis of six Georgian newspapers between 1991 and 2012. Information regarding the newspaper selection, sampling, and coding procedures is provided in the Supplementary File. The data consists of 1,186 newspaper articles, out of which 809 were identified as being related to the topics of interest (ethnicity, ethnic or governmental conflicts, and political institutions) and, therefore, further analysed at appeal level. Out of the 4,541 appeals identified in these articles, 13.4% were coded as nationalist. Statements were coded as nationalist if they referred to the exclusion from certain political/civil rights of other actors, or expressed hostile attitudes towards them, and if at least two ethnic/national groups were involved. Therefore, the network of the nationalist discourse in this study by default represents a negative and confrontational interaction between actors.

Given the conceptualization of nationalist discourse in this study, the latter is conceived as a set of elements including: the actual content of appeals; the constellation of actors around these appeals (represented as senders or addressees); and patterns of interaction among actors, as well as between actors and the content of the appeals. Hence, the nationalist discourse in this study is represented as a (discourse) network, wherein actors are engaged in nationalist interaction among each other. As this relational nature of the data requires a method that has the properties of analysing structural aspects, social network analysis is considered to be the most effective approach to be used here. According to the theoretical propositions of the study, the major goal is to identify if certain actors involved in the discourse cluster in groups based on their structural similarities, and whether the boundaries of these clusters follow ethno-national lines. It is the claim of this study that in this way we can identify and measure the divisiveness of nationalist discourse. Structural equivalence analysis is utilized exactly for this reason: to detect the extent of structural similarities between the actors and to map their clustering patterns.

Studying the divisiveness of nationalist discourse using structural equivalence analysis, and social network analysis in general, is innovative because it has never been done before. Applying social network analysis methods for analysing policy discourses has already been proven to be effective (Adam, 2007; Fisher, Waggle, & Leifeld, 2013). Some authors have also demonstrated the usefulness of structural equivalence analysis specifically for studying polarization patterns in policy debates (Fisher, Leifeld, & Iwaki, 2013). This study shows how the method of structural equivalence analysis can be utilized to tease out the hidden structures of nationalist discourse more effectively, as compared to a mere count of word frequencies or qualitative accounts of small numbers of texts.

Nodes are defined as all the actors who are mentioned by the articles either as senders or as addressees of the nationalist discourse. For all the actors coded, the data also includes information on their attribution to ethnic groups or nationality. This article is not interested in how much effect the nationalist appeals of a certain set of actors have on nationalist mobilization, as compared to others. Rather, it is primarily interested in a general nationalist discourse that is present in a public sphere. Therefore, while theoretically the weights of nationalist appeals might vary in terms of their capacity for mobilization, depending on who makes an appeal (Conversi, 1995; Hroch, 1985; Kedourie, 1993; Snyder, 2000), this study does not differentiate empirically between the leading ethnic entrepreneurs and actors on the fringes of a movement. It rather takes 'elite' as a cumulative unit and conceives the fact that an actor is given a voice in media as a proxy of being a potential agent of ethnic entrepreneurship.

The edges are defined as the number of statements with which actors target each other. Thus, the networks, and their respective adjacency matrices, in this analysis are directed and asymmetric. Edges represent not only the existence of a link but also its strength. Entries on a diagonal of the matrix are not meaningful since the occurrence of an actor sending a nationalist appeal to itself is not considered.

The goal of the analysis is to identify the clusters of actors that are related with each other indirectly, based on similarities in who they attack with their nationalist appeals, how intense these attacks are, as well as who they receive attacks from. In network analytic terms, this means that an actor *i* is similar to an actor *j* if both *i* and *j* are linked to an actor *k*. Actors *i* and *j* do not need to be directly related to each other. Using the method of structural equivalence analysis, we will be able to compare the interaction profiles of all the actor dyads involved in the discourse and thereby determine their structural similarity and dissimilarity (Borgatti, Everett, & Johnson, 2013; Lorrain & White, 1971). Interaction profile here refers to all the out-going, as well as in-coming, ties of an actor. Since the network is directed, the interaction profile of an actor *i* in the socio-matrix represents all the entries adjacent to this actor both in its respective row and the column. Structural similarity is measured using Pearson Correlation Coefficient. This choice over Jaccard Coefficient and Euclidean distance is guided by two factors. First, the data is not binary but count; and second, the study is primarily interested in the patterns of similarities rather than dissimilarities between the actor profiles.

The structural equivalence analysis proceeds in several successive steps. First, the profile analysis of each actor dyad is conducted by calculating the correlation coefficients between their respective rows and columns in

the adjacency matrix X. Second, the resulting correlation matrix C is constructed in which every entry *ij* represents a correlation coefficient between the interaction profiles of actors *i* and *j*—thus, the extent to which these two actors are structurally equivalent. The correlation matrix C is undirected, i.e., symmetric, and therefore the correlation coefficient in the entry (*i*, *j*) is the same as that in the entry (*j*, *i*). The stronger the correlation between two actors, i.e., the closer the coefficient is to +1, the more structurally equivalent these actors are.

The correlation matrix does not allow the identification of patterns easily, so, in order to separate the groups of structurally similar actors from those who are dissimilar, the next step is to partition them into mutually exclusive clusters based on their degree of structural equivalence. Actors who are structurally more equivalent will be grouped together in a cluster and separated from other clusters comprised of the actors who are structurally less similar (Wasserman & Faust, 2009, p. 376). In order to account for the robustness of the clustering patterns of actors, the analysis in this section utilizes two alternative methods of partitioning—hierarchical cluster analysis and multidimensional scaling. The first method subdivides nodes into subsets of actors who are structurally equivalent at level α. The procedure is called hierarchical because partitioning occurs at successively less restrictive values of α (Wasserman & Faust, 2009, p. 381). The second method uses spatial technique to represent the structural similarity and dissimilarity of actors based on their spatial proximity in two-dimensional space (Wasserman & Faust, 2009, p. 387). Structurally more equivalent actors are located closer to each other, while less equivalent actors are placed further away, thus forming groups of those who are similar, and separating them from those who are different. This analysis is performed using the social network analysis software, UCINET. All the respective correlation matrices can be found in the Supplementary File.

Further, electoral periods are defined as the election date, three months before, and one month after it. Since the sample contains four months in each year, electoral periods are understood as electoral years, i.e., the years in which elections were held. Non-electoral years are defined as a random sample of four months in each year without elections. In addition, in line with Cederman et al. (2013), early elections are understood as the first two competitive national level elections, which, in the Georgian case, means the elections of 1991 and 1992. All national elections starting from 1995 were coded as late elections.

6. 'Us' vs. 'Them' as Structural Equivalence in the Georgian Print Media

Does the partitioning of structurally equivalent actors involved in the nationalist discourse in the Georgian newspapers yield groups corresponding to the case-specific 'us' vs. 'them'?

The analysis starts by contrasting the clustering patterns of the structurally equivalent actors in the nationalist discourse with that of the non-nationalist discourse. The comparison presented in Figures 2 and 3. demonstrates an immediate difference between the two graphs. Actors involved in the nationalist discourse (Figure 2) form two clusters clearly delimitated from each other at the level $\alpha = 0.142$.

Looking at the ethnic or national attribution of actors in these clusters, we can easily identify that the right side of the graph is completely homogenous, represented only by the Georgian actors, while the cluster on the left side is rather mixed, comprised of all the other ethno-national groups. The clustering pattern of the nationalist discourse in Figure 2 reflects several essential points: The media gives voice predominantly to the members of the in-group (i.e., Georgian actors) and, therefore, the latter are systematically similar in being the dominant senders of the nationalist appeals present in the media discourse; the members of the in-group are also systematically similar in directing nationalist statements to the same other groups; moreover, they are similar in how intense their nationalist statements are towards specific other actors.

As the values of α become restrictive in Figure 2, the cluster of 'them' is being divided into subsequent sub-clusters. The West and international organizations—actors perceived by the Georgian state as potential allies and sources of material and non-material aid—are grouped together ($\alpha = 0.396$). Actors with whom Georgians have experienced ethno-political tensions and violent conflicts (i.e., Abkhazia, South Ossetia, Russia, the Soviet Union, and other ethnic minorities concentrated in Georgia) are grouped together ($\alpha = 0.523$). As the clustering becomes more fine-grained, the two ethnic groups with whom Georgians have experienced violent conflicts and have not resolved those conflicts to date—Abkhazians and South Ossetians—form one cluster ($\alpha = 0.844$). It is surprising to observe the actor Georgians on the right of Figure 2 among the out-groups. This, however, can be explained by the fact that, when addressed by nationalist appeals, Georgian actors might be referred in such a cumulative way in order to emphasize the category of ethnicity. Contrary to this picture, the clustering pattern of actors in non-nationalist appeals (Figure 3) does not reveal any theoretically meaningful groups, i.e., actors are mixed across clusters when considering their ethno-national attribution. Thus, the exploratory analysis of the group structure of the discourse in the Georgian print media shows that compared to the regular, non-nationalist appeals, nationalist discourse entails the actor structure, whereby the members of the in-group are systematically similar in directing their nationalist statements to the same other groups.

To test the robustness of these clustering patterns, the correlation matrices were submitted to multidimensional scaling, an alternative method of partitioning. The results from this analysis are presented in Figures 4 and 5, which compare the spatial distribution of the structurally

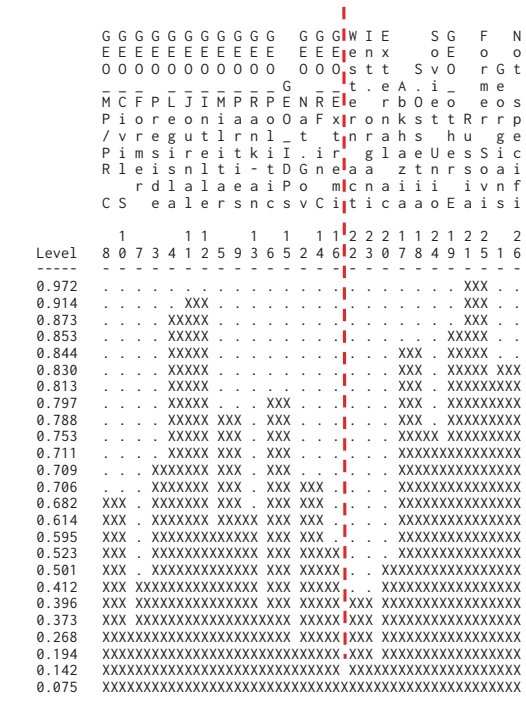

Figure 2. Hierarchical clustering of the structurally equivalent actors in nationalist appeals. Notes: Columns represent actors. Rows labelled as 'Level' show the stages of clustering. Numbers of these levels refer to the degree of association (structural similarity) among the actors in a given cluster. The higher this number, the stronger is the association among actors. The sign 'x' placed between two actors indicates that these actors are clustered together at a given level. The red vertical line is inserted manually in order to illustrate the specific clustering pattern more clearly.

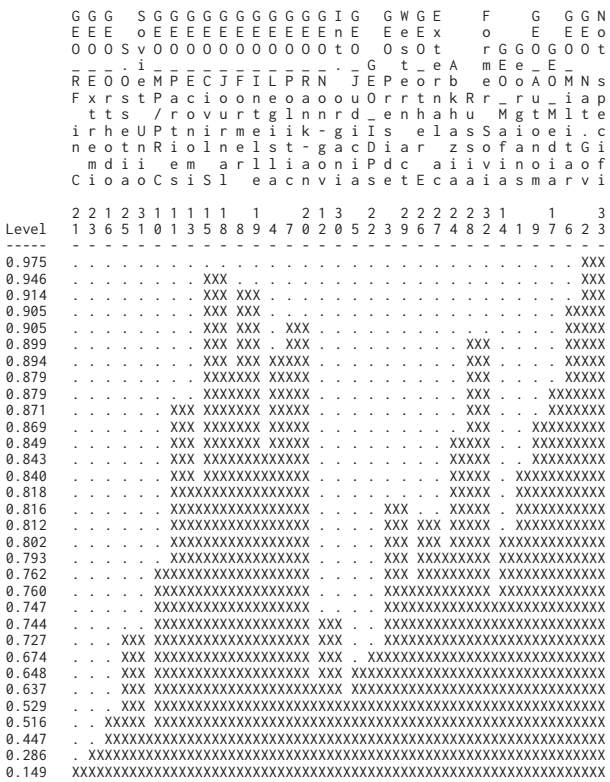

Figure 3. Hierarchical clustering of the structurally equivalent actors in non-nationalist appeals. Notes: Columns represent actors. Rows labelled as 'Level' show the stages of clustering. Numbers of these levels refer to the degree of association (structural similarity) among the actors in a given cluster. The higher this number, the stronger is the association among actors. The sign 'x' placed between two actors indicates that these actors are clustered together at a given level.

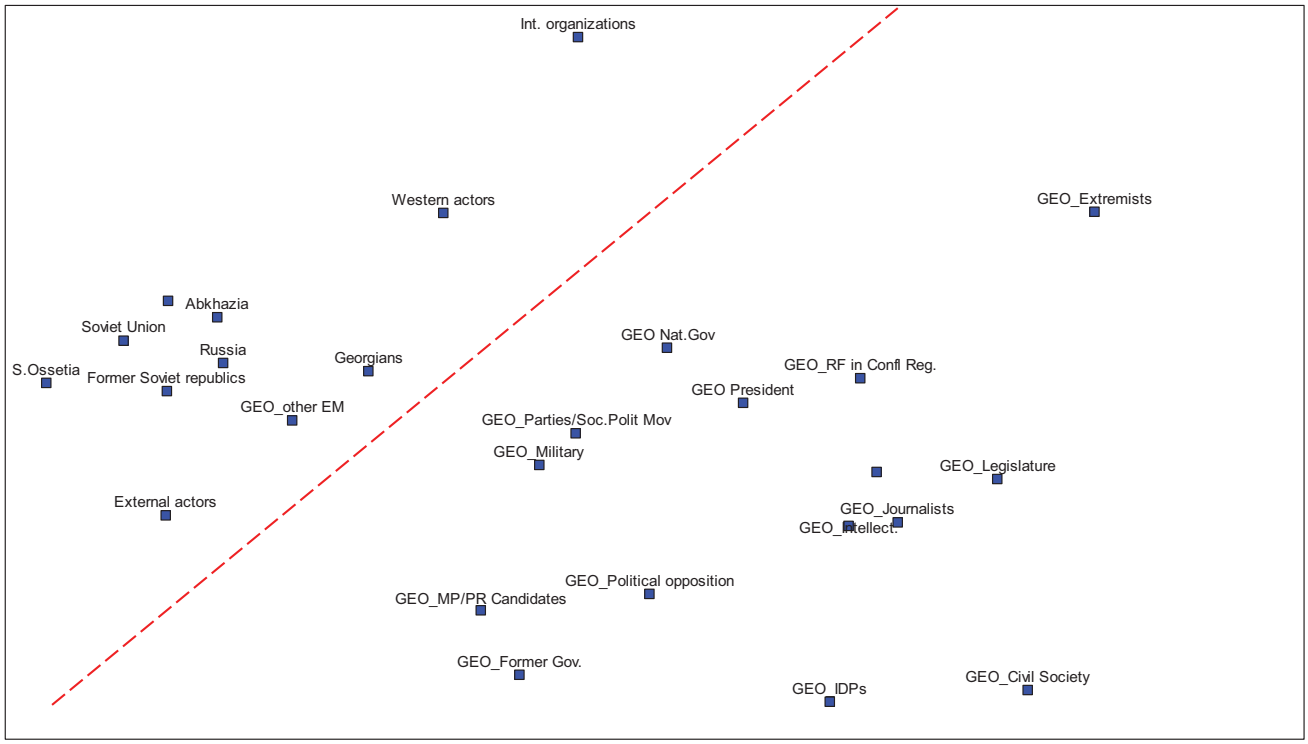

Figure 4. Multidimensional scaling of structurally equivalent actors in nationalist appeals. Notes: Multidimensional scaling is used as an alternative visual representation of the clustering pattern of structurally equivalent actors in Figure 2. Nodes here represent actors. Proximity among these nodes visualizes the degree of structural similarity among actors. The red line is inserted manually in order to illustrate the divide more clearly. Stress = 0.187.

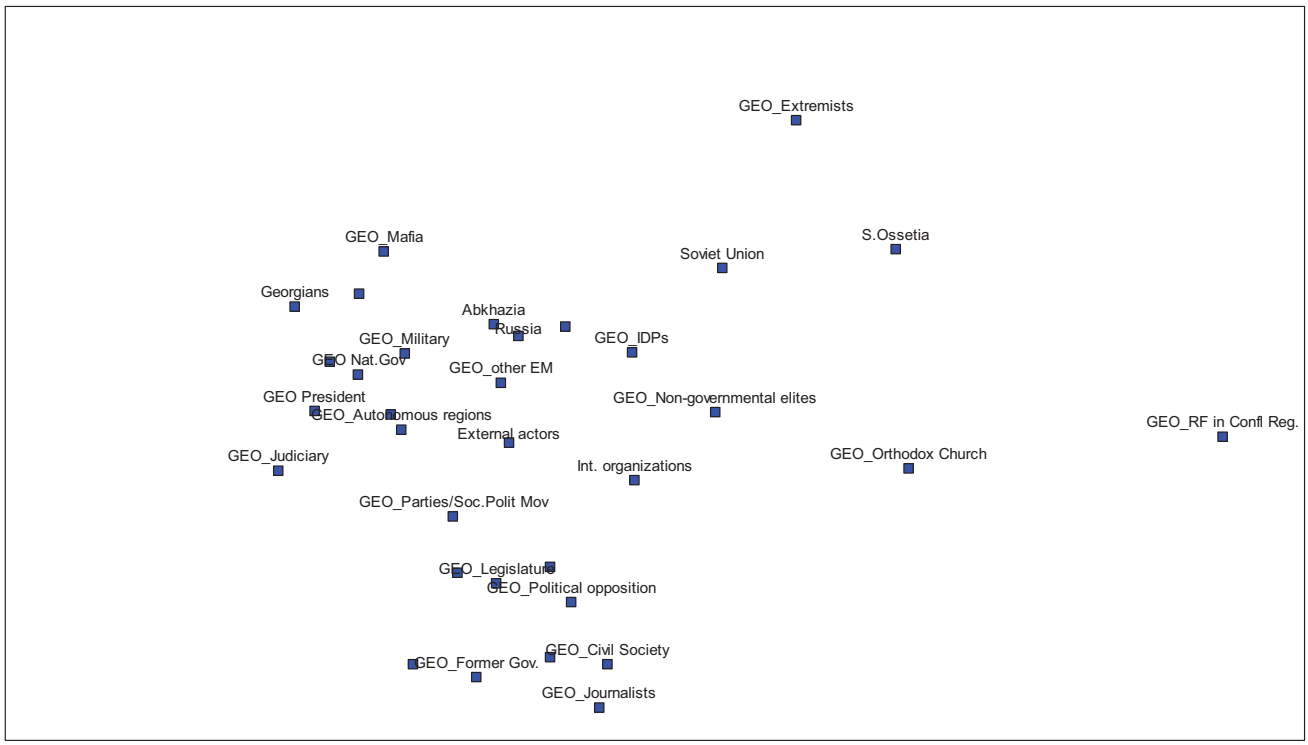

Figure 5. Multidimensional scaling of structurally equivalent actors in non-nationalist appeals. Notes: Multidimensional scaling is used as an alternative visual representation of the clustering pattern of structurally equivalent actors in Figure 3. Nodes here represent actors. Proximity among these nodes visualizes the degree of structural similarity among actors. The red line is inserted manually in order to illustrate the divide more clearly. Stress = 0.148.

equivalent actors in nationalist and non-nationalist appeals. Similar to the results of the hierarchical clustering, the comparison here reveals an immediate difference between the two. In the multidimensional scaling picture of the nationalist appeals (Figure 4), Georgian actors alone dominate the lower right corner of the graph, while all the other ethno-national groups of actors are located in the upper left corner. Thus, the divisive structure of the 'us' vs. 'them' discourse is maintained. In contrast, the multidimensional scaling of the non-nationalist appeals (Figure 5) yields a fully mixed picture, i.e., the spatial distribution of the actors does not form any cluster whatsoever.

The next step is to test whether and how the clustering patterns identified above are affected by electoral periods. This analysis will also serve the additional function of ruling out the possibility that the patterns identified in the exploratory analysis are an artefact of the definition of the nationalist appeals in this study, thus validating the proposed method of measurement.

Figures 6 and 7 compare multidimensional scaling of structurally equivalent actors in the nationalist discourse during electoral years to that of the non-electoral years. In line with the stated expectation, this comparison shows that the nationalist discourse differs in its divisiveness depending on what period we look at. The two camps of 'us' (all the Georgians) and 'them' (everybody else) is clearly visible in the nationalist discourse of the electoral periods (Figure 6), while we cannot identify the same clustering pattern in the nationalist appeals for non-electoral years (Figure 7). We can see from the structure of the nationalist appeals during electoral years that the West and international organizations are also clearly delimited from the actors with which Georgians have experienced ethno-political conflicts.

The finding reveals that nationalist discourse becomes more intense during electoral periods not only because actors with stakes in elections make nationalist appeals more frequently, but also because the general structure of the discourse becomes more divisive, yielding sharper divisions between the in-group and out-groups. Apart from revealing how nationalist discourse becomes more divisive during elections, this finding also serves as an important validation of the proposed method of measuring the actor structure of the nationalist discourse. As the comparison here was made, not between the nationalist and non-nationalist appeals, but within the nationalist discourse itself, it has demonstrated that the identified patterns do not stem from the rules of coding nationalist appeals in this study.

Figures 8 and 9 look deeper into the nationalist discourse during electoral periods and explore whether early electoral periods are more prone to divisive discourse than the later ones. In line with the literature attributing particular risks of conflict to the first and second elections after independence, findings from this analysis show that early elections in Georgia are indeed different from later elections in terms of strong polarization between the national 'us' and 'them.' The spatial distribution of the structurally equivalent actors in Figure 8

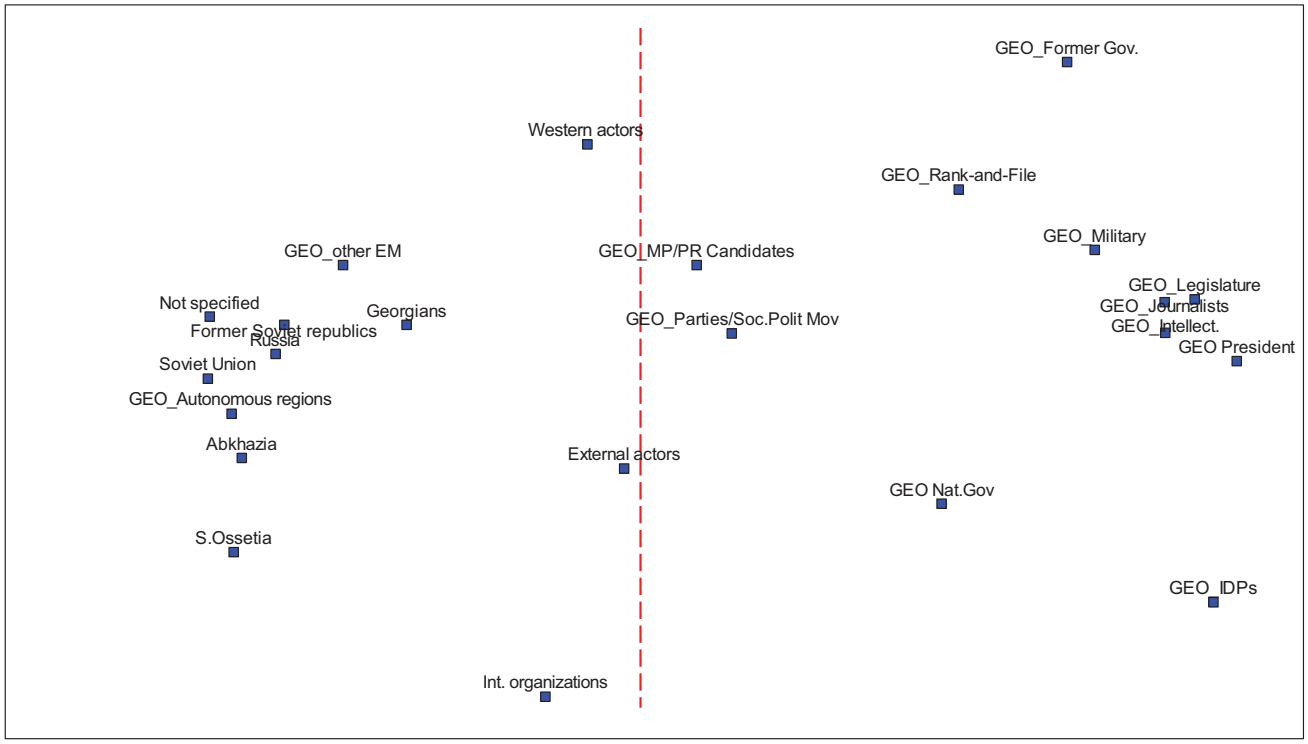

Figure 6. Multidimensional scaling of structurally equivalent actors in nationalist appeals during electoral periods. Nodes represent actors. Proximity among these nodes visualizes their degree of structural similarity based on correlation coeficients. The red line is inserted manually in order to illustrate the divide more clearly. Stress = 0.154.

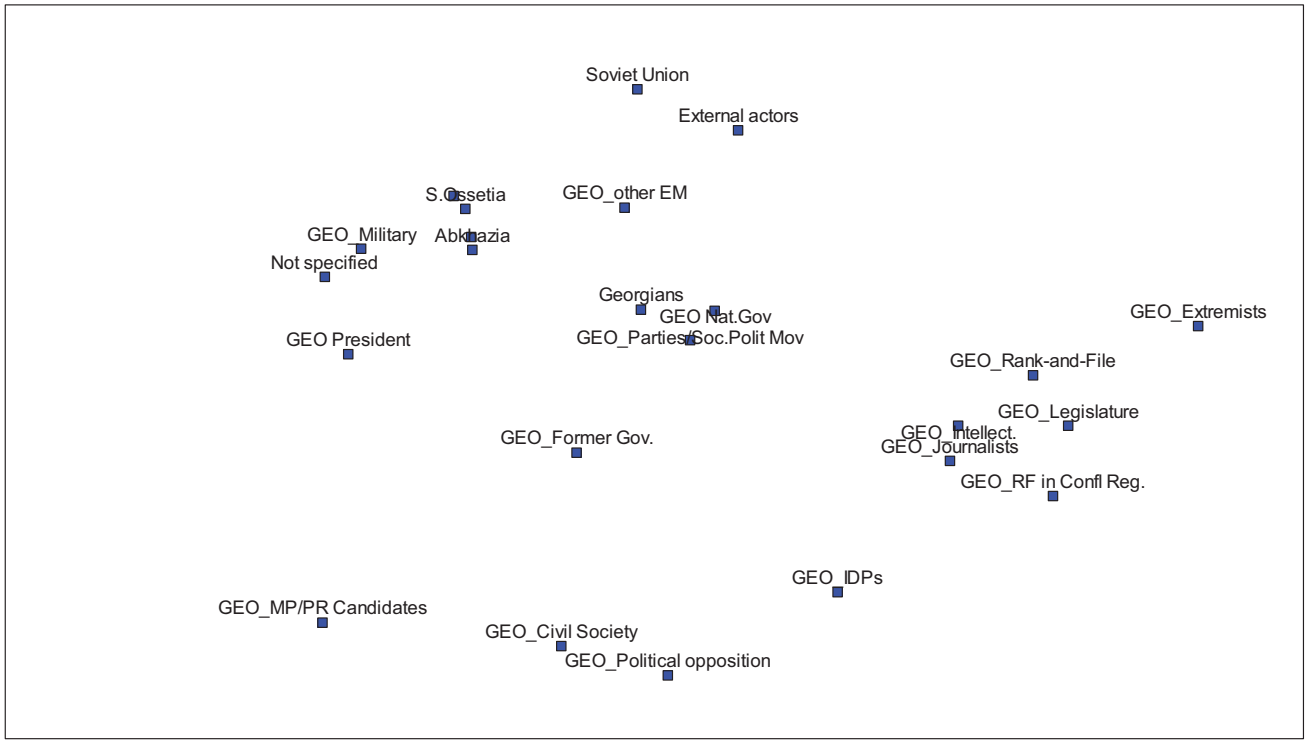

Figure 7. Multidimensional scaling of structurally equivalent actors in nationalist appeals during non-electoral periods. Nodes represent actors. Proximity among these nodes visualizes their degree of structural similarity based on correlation coeficients. Stress = 0.167.

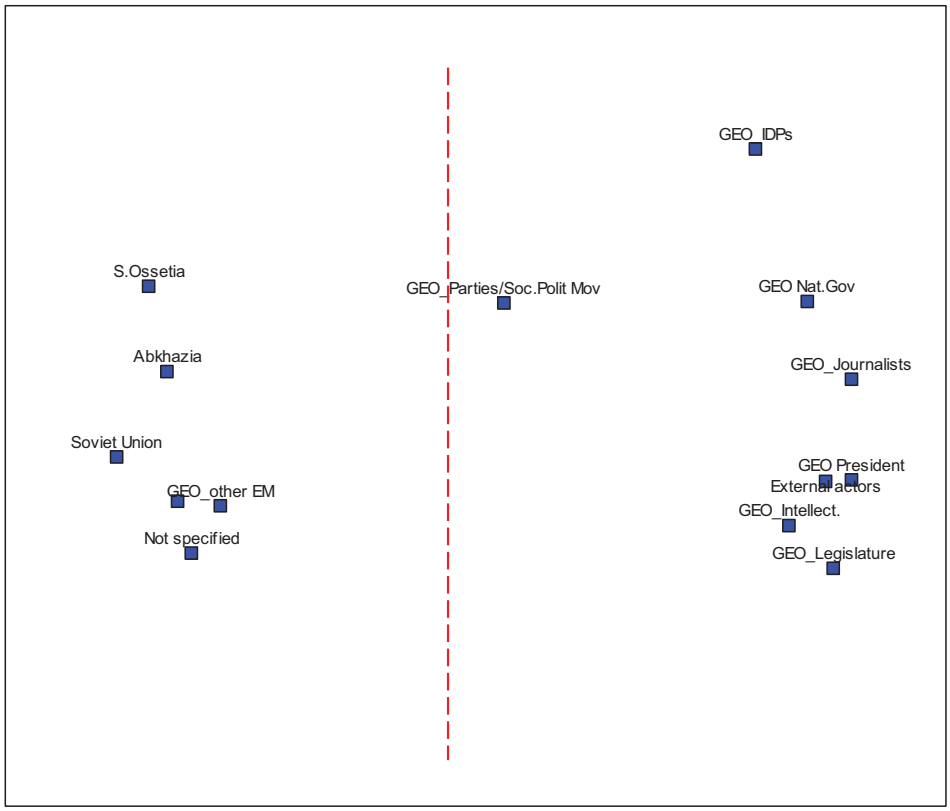

Figure 8. Multidimensional scaling of structurally equivalent actors in nationalist appeals during early electoral periods. Notes: Nodes represent actors. Proximity among these nodes visualizes their degree of structural similarity based on correlation coeficients. The red line is inserted manually in order to illustrate the divide more clearly. Stress = 0.087.

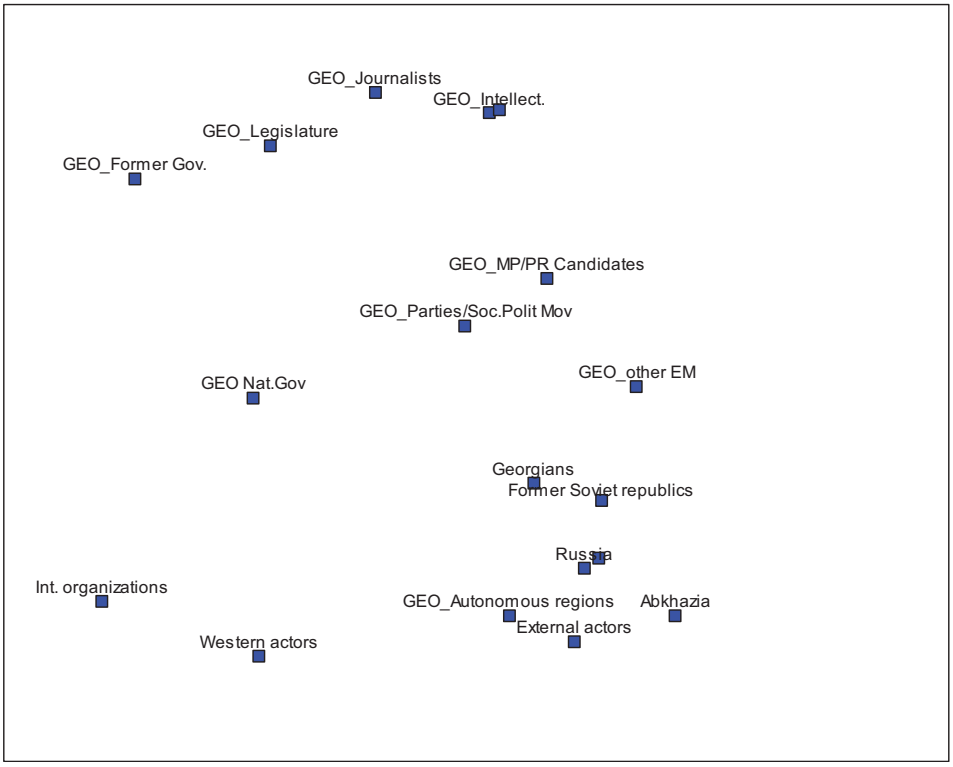

Figure 9. Multidimensional scaling of structurally equivalent actors in nationalist appeals during late electoral periods. Notes: Nodes represent actors. Proximity among these nodes visualizes their degree of structural similarity based on correlation coeficients. Stress = 0.133.

shows that the distance between the two clusters is particularly large during early elections.

Certain actor clusters also exist in the discourse of late electoral periods (Figure 9). For example, the West and international organizations are in closer proximity with each other than with Georgian actors, or the actors with which Georgians have experienced tensions and/or violent conflict. The same holds true for Abkhazia, Autonomous Regions, Russia and the Soviet Union. Although the external actors here are represented as part of the in-group, a clear-cut delineation between the in-group and out-groups, with the clusters situated so far from each other in Figure 8 indicates that nationalist polarization between 'us' and 'them' is indeed stronger during early electoral periods as compared to the later electoral periods.

7. Conclusions

Adding to the already established practices of analysing in-group/out-group divisions in ideological and political discourses and extending on the discourse network analysis methodology, this article proposes an innovative way of studying the divisiveness of the nationalist discourse using the social network analysis method of structural equivalence analysis. The practical applicability of this approach was demonstrated by analysing the relationship between the instances of increased political participation during democratic transition and the nationalist 'us' and 'them' polarization in the Georgian print media of 1991–2012. The findings suggest that during electoral periods nationalist discourse intensifies not only in terms of its degree, i.e., nationalist statements become more frequent, but also in terms of its kind, i.e., the actor structure of the discourse yields sharper divisions between the in-group and the out-groups.

There are good reasons to think that the exogenous shock of the 2008 war might have affected the patterns of divisiveness of nationalist discourse in the Georgian print media. More precisely, the clustering structure of the discourse during the next few rounds of elections after 2008 would have probably reflected increased tensions with certain out-groups. However, as the first elections after the 2008 war only took place in 2012 and the data that this study relies on covers the period only up until the end of 2012, it does not provide enough data points to conduct structural equivalence analysis of the nationalist discourse in this period. This limitation of the study needs to be improved through further research of the effects of such factors on the divisiveness of the nationalist discourse.

The implications of this study can be understood in relation to what Billig calls "banal nationalism" (1995). The latter sees nationhood as reproduced daily through ideological habits, which remain unnamed and unnoticed. The divisive actor constellation of the nationalist discourse in the media identified in this study is, thus, yet another manifestation of 'banal nationalism.' It is not

readily recognizable for a reader, and thus goes unnoticed. However, if we agree that the news media contributes to the construction of reality through its content, this deep discursive structure, which yields such a sharp division between the national in-group and the out-groups, has the potential to reinforce cohesion among the in-group members, but, at the same time, fire up antagonism towards the out-group members. Yet, the findings from this analysis should be taken only as a starting point. While this study has discovered that the structures of the nationalist appeals in the Georgian print media of the democratization period convey a strong 'us' vs. 'them' polarization, through the actor constellation of this discourse, further empirical research is needed to examine, first, to what extent is the pattern observed here identifiable in other cases, and second, to what extent these discursive structures affect the actual in-group/out-group polarization among media consumers.

Acknowledgments

This article is the result of the research funded by the Swiss National Science Foundation (SNSF) through the Doc.Mobility and Open Access Publications grants. The project has been conducted under the NCCR Democracy program. I would like to thank Lars-Erik Cederman, Katrin Voltmer and Maro Steenbergen for their invaluable feedback and input on the earlier version of this article. I am grateful to the anonymous reviewers for their comments and suggestions. I am also thankful to Silke Adam, Daniel Bochsler, Guy Schvitz, Miriam Haenni, Kushtrim Veseli, Nils-Christian Bormann, Cosima Myer and Livia Rohrbach for their helpful comments and insights. Last but not least, I am grateful to the Center for Social Sciences and the five coders from Georgia who have worked very hard to collect the data used in this study.

Conflict of Interests

The author declares no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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COGITATIO

Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 257–271
DOI: 10.17645/pag.v8i2.2609

Article

Solidarity in the Public Sphere: A Discourse Network Analysis of German Newspapers (2008–2017)

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Submitted: 31 October 2019 | Accepted: 1 March 2020 | Published: 2 June 2020

Abstract
Multiple crises in the EU have sparked a renaissance of the concept of solidarity. However, discursive approaches to solidarity and the public understanding of solidarity have hardly received scholarly attention. Empirical research on solidarity is rather centered on welfare institutions as well as on individual attitudes and behavior. To shed new light on solidarity in public discourse, we investigate in which policy fields the term is most often used, which actors refer to it and how different types of solidarity are covered in the German public discourse. We investigate the coverage of solidarity in four German newspapers (*Die Welt*, *Frankfurter Allgemeine Zeitung*, *Süddeutsche Zeitung*, *Die Tageszeitung*) from 2008 to 2017. By deploying the discourse network methodology with 306 claims in 230 news articles, we analyze the co-occurrence of actors and issues over time. Our results indicate a varying set of issues in which solidarity occurs, a rather stable actor visibility, across time and a context-dependent use of different types of solidarity. Government actors, civil society actors as well as citizens drive the solidarity discourse showing that institutional as well as non-institutional actors make use of solidarity in their public actions regarding political protest, financial issues and migration. The study provides novel insights into the interdependence of actor and issue visibility and sheds new light on solidarity in media discourses.

Keywords
discourse network analysis; Germany; newspapers; public discourses; public sphere; solidarity

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

Solidarity and crisis are interrelated. The recent debates about the Euro crisis and the migration crisis have sparked a renaissance of the concept of solidarity in general and the crisis-solidarity nexus in particular (Wallaschek, 2019a). The reason for this renewed interest in solidarity lies in its ability to solve social problems by ensuring cooperation and mutual support even in times of crisis (Lindenberg, 1998). Thus, whenever a crisis gains public attention; there arises the demand for solidarity to overcome it. Yet, what different actors actually refer to when they call for more solidarity remains highly contested (Brändle, Eisele, & Trenz, 2019).

In recent years, scholarly work on solidarity has led to theoretical as well as empirical advances in the research field (Banting & Kymlicka, 2017; Della Porta, 2018; Lahusen & Grasso, 2018; Sangiovanni, 2015). That is, scholars have investigated solidarity in various contexts, policy fields and from varying theoretical perspectives. The analysis of "institutionalised solidarity" (Gelissen, 2000) in national welfare states, and the investigation of solidary attitudes, opinions and actions in the EU have dominated the academic literature (Ciornei & Recchi,

2017; Gerhards, Lengfeld, Ignácz, Kley, & Priem, 2020; Lahusen & Grasso, 2018; van Oorschot, 2000). Discourses about solidarity in public spheres are still underexplored. However, the discursive approach allows one to investigate an everyday understanding of the rather abstract concept of solidarity, shedding light on how different actors contest the notion of solidarity in public debates. Previous research has largely focused on how specific issues are linked to solidarity or how solidarity is framed in certain European crises (Brändle et al., 2019; Closa & Maatsch, 2014; Wallaschek, 2020a; Williams & Toula, 2017).

Yet, these studies have often assumed rather than empirically investigated the link between crisis and calls for solidarity by only investigating specific crises instead of the broader public discourse. Furthermore, former work has looked at short periods of time in which a particular crisis occurred. Hence, we will fill this research gap by investigating the following research question: How is the term 'solidarity' contested in the public discourse? More precisely, this article sheds light on the nexus between actors, issues and solidarity types. We deploy the discourse network analysis (Leifeld, 2016) to examine how actors refer to different types of solidarity regarding various issues. Moreover, we track how these discourse networks change in German newspapers from 2008 to 2017. In doing so, we add to the literature in two major ways. First, we scrutinize different types of solidarity by analyzing how different actors refer to solidarity with regard to different issues in the public debate. Second, we go beyond the existing literature on solidarity contestation by investigating the public discourse without focusing on specific crises and by providing a longitudinal analysis of how the coverage of solidarity changed over a ten-year period.

2. Concepts of Solidarity

Solidarity has been a key concept in the social sciences (Lindenberg, 1998). Scholars posit that without solidarity "no meaningful political community can exist" (Auer, 2014, p. 329), as societies would fail to maintain stability and eventually fall apart. The reason for the pivotal importance of solidarity lies in its ability to solve social problems in situations when other control mechanisms such as coercion or incentives fail (Hechter, 1988; Lindenberg, 1998). In his seminal work, Durkheim (1965) argued that solidarity refers to individuals who regulate their "actions by something other than the promptings of [their] own egoism" (p. 331). Inspired by Durkheim's work, the literature on solidarity has diversified, leading to a plethora of novel theoretical approaches (Banting & Kymlicka, 2017; Bayertz, 1999; Hechter, 1988; Sangiovanni, 2015). However, the nature of solidarity remains highly contested. The debate largely centers on five key points (de Beer & Koster, 2009): (1) The *level of solidarity* refers to the distinction between solidarity organized by institutions (macro-level) and solidarity between individual actors based on specific attitudes or behaviors (micro-level; Tranow, 2019); (2) The *role of voluntariness* alludes to the debate about the motivation for acting in solidarity. While some authors argue that "solidarity is a choice" (de Beer & Koster, 2009, p. 21), others posit that it can also be coerced, as is the case with welfare state arrangements (van Oorschot, Arts, & Halman, 2005). Accordingly, some scholars locate solidarity between obligation and general acts of generosity (Auer, 2014; Taylor, 2015) or between insurance and charity (Van Parijs, 2017); (3) The *scope of solidarity* describes the circle of people with whom one shows solidarity. In other words, "who is included and who is excluded" (Stjernø, 2009, p. 16). Solidarity can therefore be conceived as concentric circles ranging from the interpersonal level (e.g., family, friends, neighborhood) to the supranational level (e.g., EU, world; Althammer, 2019; Michailidou & Trenz, 2018). Arguably, solidarity even extends to non-existent groups such as future generations or non-human entities such as animals or the environment; (4) The *form of solidarity* refers to the specific nature of the resources that are being redistributed or shared. Solidarity is primarily expressed via time (e.g., participating in demonstrations) or money (e.g., donations). However, it can also be shown in kind (e.g., blood donations, communication; de Beer & Koster, 2009); and (5) The *role of reciprocity* alludes to the question of whether solidarity is based on mutuality among members of a common group or whether it can be shown to external groups without direct or indirect compensation (Althammer, 2019; Thome, 1999).

In this article we focus on the latter aspect because the philosophical literature on solidarity convincingly argues that reciprocal relations are a key element of solidarity, which distinguishes it from related concepts such as charity and altruism (Bayertz, 1999; Wildt, 1999). In contrast to these concepts, solidarity contains the expectation to help others but also to receive help if the situation of both actors were reversed (Gouldner, 1960). Thus, the key question is not whether a reciprocal relationship exists, but rather how the reciprocal relationship is shaped. For instance, Bierhoff and Küpper (1999) distinguish between solidarity based on common interests and solidarity based on the interests of others. The former alludes to mutual support within a group of people who share the same fate or goals (in-group solidarity). Actors join forces to achieve a common goal they would otherwise be unable to attain. Take for example trade unionists who go on strike to fight for better wages. Solidarity based on the interests of others is directed at an external group (out-group solidarity). This form of solidarity is "unidirectional" (Althammer, 2019, p. 15) or "asymmetrical" (Thome, 1999, p. 122). To illustrate this form of solidarity, think for example of volunteers offering support to victims of a natural disaster.

To denote these symmetrical and asymmetrical relationships between those who give solidarity and those who receive it, O'Neill (2002, p. 201) introduced the

terms "solidarity among" and "solidarity with." It is often argued that especially in times of crisis, 'solidarity among' is a much stronger social bond compared to 'solidarity with' because it is based on some kind of similarity or shared identity. For that reason, calls for more solidarity in the EU have often been accompanied by a call for more European identity. However, 'solidarity with' also has important societal implications. For instance, it ensures support for those people, groups or countries who are in need and require help. On the flipside, it can also perpetuate existing power structures in society as:

> A dependence upon good will and the readiness of others to help creates second-class citizens who are not in a position to associate with their benefactors on the same level, and certainly not to oppose them politically. (Bayertz, 1999, p. 23)

Brändle et al. (2019, p. 711) argue that the term solidarity is highly "contested and marked by political struggle since it is tied to questions about the constitution of the political community and what is considered appropriate behavior and practice." The conceptual distinction between 'solidarity among' and 'solidarity with' guides our analysis as it is well suited to detect solidarity contestations between different actors with respect to certain issues discussed in the public sphere.

3. Public Discourses on Solidarity

As Brändle et al. (2019, p. 709) point out, "solidarity contestations have become highly salient in the news media." However, a discursive perspective on solidarity has only recently gained scholarly attention (Brändle et al., 2019; Closa & Maatsch, 2014; Wallaschek, 2020b). The advantage of the discursive approach is that it assumes that solidarity is not a predefined and stable concept, but rather that it is constantly reconstructed in public debates. It provides insights about an everyday understanding of the term and therefore offers a *bottom–up perspective* to investigate solidarity. In other words, it takes into account what different actors who publicly speak about solidarity refer to when they use the term. In modern societies, those discourses primarily take place in mediated public spheres (Dahlgren, 2002; Habermas, 2006). In this study, we focus on the dominant issues and actors in the public discourse about solidarity.

3.1. Issues

Solidarity is often evoked in times of crisis (Michailidou & Trenz, 2018). Even though studies have extensively looked at solidarity in the context of specific crises such as the Euro crisis or Europe's migration crisis (Gerhards et al., 2020; Grimmel & Giang, 2017; Lahusen & Grasso, 2018), the specific link between solidarity and crisis remains largely unexplored. On the one hand, solidarity is regarded as a means to solve societal problems through the redistribution or bundling of resources (Kolers, 2012; Stjernø, 2009). For instance, by cooperating, EU member states can implement policies that they would otherwise be unable to advance. On the other hand, crises may undermine solidarity as they tend to fuel populism and reinforce national stereotypes or xenophobic tendencies (Lahusen & Grasso, 2018). The European debt crisis as well as the migration crisis serve as two prominent cases in point to support this claim (Sierp & Karner, 2017). Wallaschek (2019a, p. 261) concludes:

> It seems that studying solidarity requires a crisis situation, because a perceived threat or danger might influence claims and attitudes towards solidarity….What is the state of solidarity in non-crisis periods and how do solidary practices, attitudes and claims change before, in and after such a crisis?

In light of this expected but understudied solidarity-crisis nexus, we focus on the question of how solidary claims change over time and whether crises influence how the news media covers solidarity. More precisely, we expect the discourse on solidarity to be dominated by issues related to key crises. For the European context, the European debt crisis and the migration crisis might be the most dominant issues related to solidarity. Furthermore, we expect that international terrorism and climate change are key issues that have dominated the public discourse in the past decade and that have been associated with solidarity (Kleinen-von Königslöw, Post, & Schäfer, 2019; Luengo & Ihlebæk, 2019).

3.2. Actors

In addition to the issues related to solidarity, this study puts emphasis on the different actors who drive the public discourse on solidarity. More precisely, we shed light on solidarity contestations, that is, which form of solidarity actors refer to: 'solidarity among' or 'solidarity with.' On a general note, empirical research has shown that elites are prominently represented in media discourses, while citizens only play a marginal role (Thorbjørnsrud & Ustad Figenschou, 2016). As Lahusen, Kousis, Kiess, and Paschou (2016, p. 544) convincingly argue:

> Discourses are dominated also in times of crisis by key policy actors…and they marginalize civil society organizations and citizens groups. Hence the crisis is not at all a window of opportunity that expands the range of groups and claims and disrupts established discourse communities.

Most content analyses explicitly dealing with solidarity contestations in the public discourse seem to support this finding. Using the migration crisis and the Euro crisis as cases in point, Wallaschek (2019b, 2020a) finds that political elites, especially national executives and party actors, are strongly represented in the print media. Along

similar lines, Brändle et al. (2019) investigate the media coverage about the migration crisis in four European countries. They suggest that state actors made over 70% of all analyzed political claims, while all other actors account for only 30% of political claims. Looking at the solidarity contestations in parliamentary debates about the European debt crisis, Closa and Maatsch (2014) demonstrate that party oppositions use solidarity claims to criticize the government for its lack of solidarity with debtor member states. To derive expectations regarding the use of 'solidarity among' or 'solidarity with,' we mainly draw on the findings of Brändle et al. (2019). Their results suggest that state actors tend to promote exclusive notions of solidarity, ergo 'solidarity with,' while societal actors primarily refer to inclusive forms of solidarity, ergo 'solidarity among.' Given the strong empirical evidence about solidarity contestations, we assume similar results will be found when looking at the public discourse more broadly. Thus, in this study we do not focus on one specific crisis, but rather investigate the general public debate about the term solidarity in the past decade.

4. Method

To answer the research question, we conducted a standardized content analysis of 306 claims in 230 articles from four national quality newspapers in Germany published between 2008 and 2017: *Die Tageszeitung*, *Süddeutsche Zeitung*, *Frankfurter Allgemeine Zeitung*, and *Die Welt*. All selected newspapers range among the largest daily newspapers in Germany in terms of circulation and account for a total of 745,522 copies per day (IVW, 2019). All investigated newspapers are influential opinion-forming media outlets and span the journalistic political spectrum: The *Die Tageszeitung* is a left-leaning newspaper, the *Süddeutsche Zeitung* is a center-left newspaper, the *Frankfurter Allgemeine Zeitung* is a center-right newspaper, and the *Die Welt* is a conservative newspaper (Eilders, 2002). The material was accessible via the database LexisNexis (*Die Tageszeitung*, *Die Welt*) or via the databases of the respective publishers (*Süddeutsche Zeitung*, *Frankfurter Allgemeine Zeitung*).

4.1. Sample

The articles of this study were defined by two criteria. First, all articles were published in the selected newspapers between 2008 and 2017. The time period was chosen because the global financial crisis in 2008 triggered the subsequent European debt crisis and European migration crisis during which the term 'solidarity' was increasingly popularized (Wallaschek, 2019b). Second, all articles contained at least one of the following words in the title or subtitle: 'solidarity,' 'solidary,' 'solidaristic.' The population contained a total of 2,234 articles: *Die Tageszeitung* (685 articles, 30.6%), *Süddeutsche Zeitung* (906 articles, 40.5%), *Frankfurter Allgemeine Zeitung* (463 articles, 20.7%), *Die Welt* (180 articles, 8.1%). To draw a sample for the manual standardized content analysis, we created artificial weeks starting with Monday of the first calendar week of 2008, followed by Tuesday of the second calendar week of 2008 and so on. By this, we reduced the final sample to a manageable amount of 300 articles and ensured that all years, months, and weekdays were equally represented. From the selected weeks, we downloaded all articles that met the selection criterion outlined above: *Die Tageszeitung* (96 articles, 32%), *Süddeutsche Zeitung* (120 articles, 40%), *Frankfurter Allgemeine Zeitung* (64 articles, 21.3%), *Die Welt* (20 articles, 6.7%). Thus, our sample roughly matches the population in terms of distribution among the four selected newspapers.

4.2. Unit of Analysis: Statements

For the discourse network analysis, we used statements as the primary unit of analysis. We coded the newspapers' material by following the claims-making approach (Koopmans & Statham, 1999) that defines a claim as "the purposive and public articulation of political demands, calls to action, proposals, criticisms or physical attacks, which, actually or potentially, affect the interests or integrity of the claimants and/or other collective actors" (Koopmans, 2007, p. 189). In each claim we categorized: (1) the actor voicing a statement, its institutional/organization affiliation, (2) the issue or context which the statement refers to, and (3) the position of the statement. Coders were instructed to code a statement only if all categories were available in the newspaper article. For each statement, we further coded the solidarity relation ('solidarity among' or 'solidarity with'). 70 articles were excluded from the sample because they did not contain an actor and were therefore ineligible for subsequent data analysis. In total, we coded 306 statements in 230 articles.

Figure 1 gives an overview of the number of coded statements in each newspaper as well as the distribution per year. It shows a rather similar distribution of statements for the *Süddeutsche Zeitung* and the *Die Tageszeitung* since 2011 while the *Frankfurter Allgemeine Zeitung* and the *Die Welt* show different patterns. In comparison to the center-left *Süddeutsche Zeitung* and left-leaning *Die Tageszeitung*, we find an almost inverse distribution for the *Frankfurter Allgemeine Zeitung* from 2012–2015 and hardly any changes in the number of statements for the right-conservative *Die Welt* newspaper. Nonetheless, the year 2015 marks the peak in the number of coded statements in three of the four newspapers (the exception is the *Frankfurter Allgemeine Zeitung*). This is related to Europe's migration crisis and a broad debate on solidarity in the context of immigration, asylum and refugees (see Section 4.3).

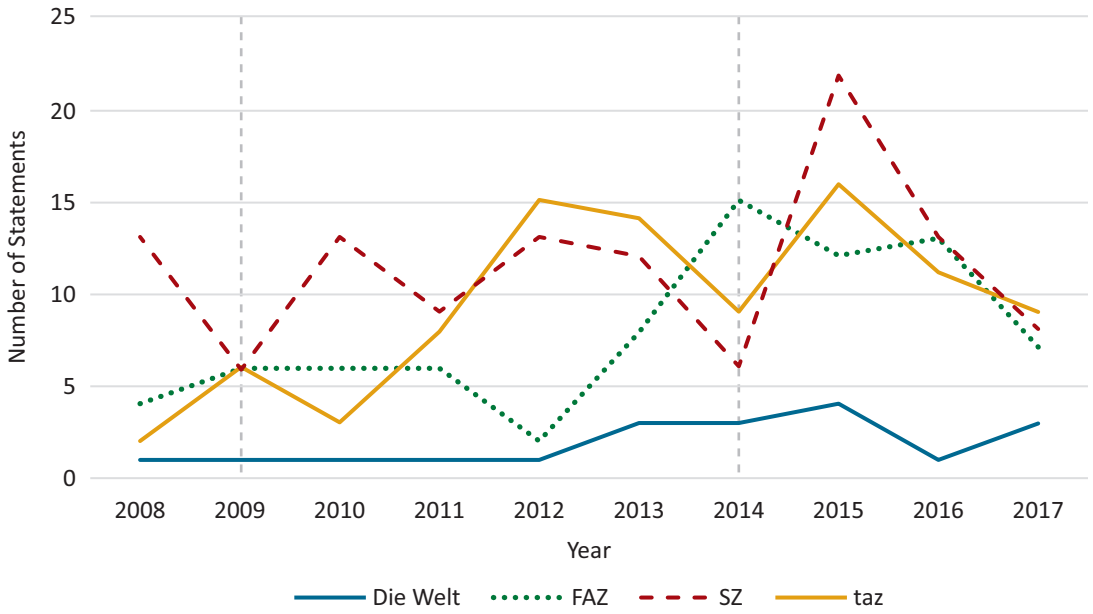

Figure 1. Number of statements per newspaper and year.

4.3. Measures

4.3.1. Formal Categories

At the article level we coded the name of the newspaper, the publishing date and the length of the article (in total words).

4.3.2. Actors

We coded an actor if he/she is directly or indirectly quoted in the article and takes a position on a solidarity issue. It is irrelevant whether this is an individual actor (e.g., Angela Merkel, Donald Tusk) or a collective actor (e.g., European Central Bank, Greenpeace). As it was impossible to compile a complete list of all potential actors, we instructed coders to note the name of the actors. For individual actors, we further coded the organization they work for or represent. In case the organization was not mentioned in the article, coders were assigned to conduct an internet search. Moreover, we coded the organization type of the actor voicing a statement. For that, we compiled a list of actors according to their function (e.g., Angela Merkel as member of the national government).

4.3.3. Issue

To code the solidarity issue to which the actors of a statement refer, we opted for a stepwise process. First, coders were instructed to describe the issue in one sentence (e.g., solidarity with Syrian refugees in the EU). Second, the authors grouped the issues into codes. All coders had to unanimously agree to assign the description of the issues to specific issue codes. In case of disagreement, the coders deliberated about the issue code until a common agreement was found (e.g., solidarity with Syrian refugees in the EU as a migration issue).

4.3.4. Position

We further coded whether the actor of a statement evaluates the issue positively or negatively. For instance, actors may demand more solidarity among EU member states to solve the European debt crisis. Yet, actors may criticize EU member states for acting in solidarity. If a statement could not be clearly assigned to a position, the statement was not coded. However, if the actor of a statement took a balanced position and positive as well as negative evaluations could be clearly identified, then the statements were coded separately (e.g., one time as positive, one time as negative). Since approximately 90% of all claims are coded positively, thus, almost all actors support any kind of solidarity on different issues, we do not investigate this category any further in our analysis.

4.3.5. Solidarity Relation

Drawing on the seminal distinction drawn by O'Neill (2002), we further coded whether a statement refers to 'solidarity among' or 'solidarity with.' For that, coders were provided with detailed explanations of both solidarity types. In total, 44% (135 statements) of all statements are 'solidarity among' claims, referring to solidarity within a social group. On the one hand, if a German politician demands more solidarity between NATO members, it is coded as 'solidarity among' because the statement refers to solidary actions among NATO member states. On the other hand, if a German civil society organization claims solidarity with journalists in Iraq or Turkey because they are persecuted, then we coded it as 'solidarity with' (56% of all statements/171 statements).

4.4. Coding Procedure and Pretest

An extensive pretesting period was needed to ensure sufficient reliability of the codebook. For that, we provided coders with extensive coding instructions and practical examples for each variable. In a first step, we discussed the codebook with German native speaking coders, using two exemplary articles. As a result of this procedure, we condensed coding categories, adjusted problematic categories, clarified coding instructions, and added examples to minimize potential ambiguity. In a second step, we drew a random sample of 10 articles for an extensive pretest with four coders. The pretest revealed sufficient intercoder reliability. For all coded categories, the agreement between coders was 78%.

Afterwards, we computed a discourse network analysis (Leifeld, 2016; Leifeld & Haunss, 2012), which brings together content-oriented and actor-centered coding methods. Thus, it sheds light on the co-occurrence of issues and actors in public debates. The discourse network analysis combines discourse analysis and social network analysis and is, in its fundamental network structure, a bipartite network. An actor and an issue are linked if the actor refers to the issue in its claim. Based on this network structure, one-mode projections can be computed to analyze the actor network or issue network. For our study, we use the two-mode network structure to study the discourse network dynamics regarding changing actor visibilities and issue presence. The difference between the two types of solidarity ('solidarity among' vs. 'solidarity with') is visualized as two different edges and displays a multiplex network. This demonstrates which actor uses what kind of solidarity in relation to which issue and whether we find patterns that are related to the overall solidarity discourse. The eigenvector centrality of actors and issues is calculated (Bonacich, 1987). It not only counts the number of edges a node has, but also analyzes whether the node is linked to other central nodes in the network structure. The eigenvector centrality scale runs from 0 to 1 and the higher the value, the more central is the node in the network.

5. Findings and Discussion

In our empirical analysis, we proceed in three steps. First, we map the solidarity discourse network and show the interconnectedness of actors and issues that they address in their statements. We highlight what type of solidarity relation is linked to which actors and issues. Second, we visualize the discourse network in three different time periods to identify changes in the (co-)occurrence of actors and issues over time. Lastly, we focus on the issue centrality in order to show the discursive dynamics in the German solidarity debate.

5.1. Mapping the Solidarity Discourse

The discourse on solidarity shows a great variance of actors and issues that are discussed in the sampled print media. A total of 16 different issues have been coded and 21 functional actor groups have been identified in the debate. This results in 37 nodes and 306 edges in the discourse network. Government actors, civil society groups as well as citizens are the most central groups in the discourse (see Table A3 in the Supplementary File) because they claim various issues in their multiple statements. While we expected the presence of government actors, the visibility of civil society groups and especially citizens demonstrates that the debate on solidarity alludes to less institutionalized actors. The low centrality of international and European actors reveals that the German discourse on solidarity is hardly Europeanized on the actor dimension.

Regarding the type of edges, we identified 135 'solidarity among'-edges and 171 'solidarity with'-edges which shows a rather balanced use of both solidarity types in the discourse. However, they are used by different actors and refer to different issues (see Figure 2 and Table A5 in the Supplementary File). We have divided the network along the different solidarity relations. While the upper discourse network shows the 'solidarity among'-relations, the lower network graph visualizes the 'solidarity with'-discourse networks. The size of the nodes and labels is based on eigenvector centrality. The two networks show two crucial findings. On the one hand, both networks show similarities regarding the strong visibility of government actors and an important reference to migration (among other issues). Hence, national executive actors are key actors in the discourse and predominantly refer to in-group solidarity. As such, these statements targeted issues on security (NATO membership) or financial issues (European debt crisis). Migration is one of the most important issues in the solidarity discourse and is considered to be relevant for both solidarity types, solidarity among members of a group and solidarity with others (beyond the group boundaries; see also the centrality scores in Table A2 in the Supplementary File). On the other hand, the two networks have unique actor and issue appearances. While the government actors are strongly visible in both networks, the 'solidarity with'-discourse has more actors who are visible and not marginalized than the discourse on 'solidarity among.' In particular, citizens and civil society groups are more present in the 'solidarity with'-discourse and this is underlined by the high visibility of the two issues of political protest and civic rights and freedom. Actors—especially civil society groups—claiming to act in solidarity with other groups because they support protest and social movements in other countries, stand up for the rights of minorities and marginalized groups or want to protect the rights and freedoms of the people. When these actors engage in the debate on solidarity, they mainly refer to solidarity beyond their own group and mobilize the public to show solidarity with others such as the Russian punk band Pussy Riot, Occupy Wall Street in New York or the protest and democratization movements in the Arab Spring.

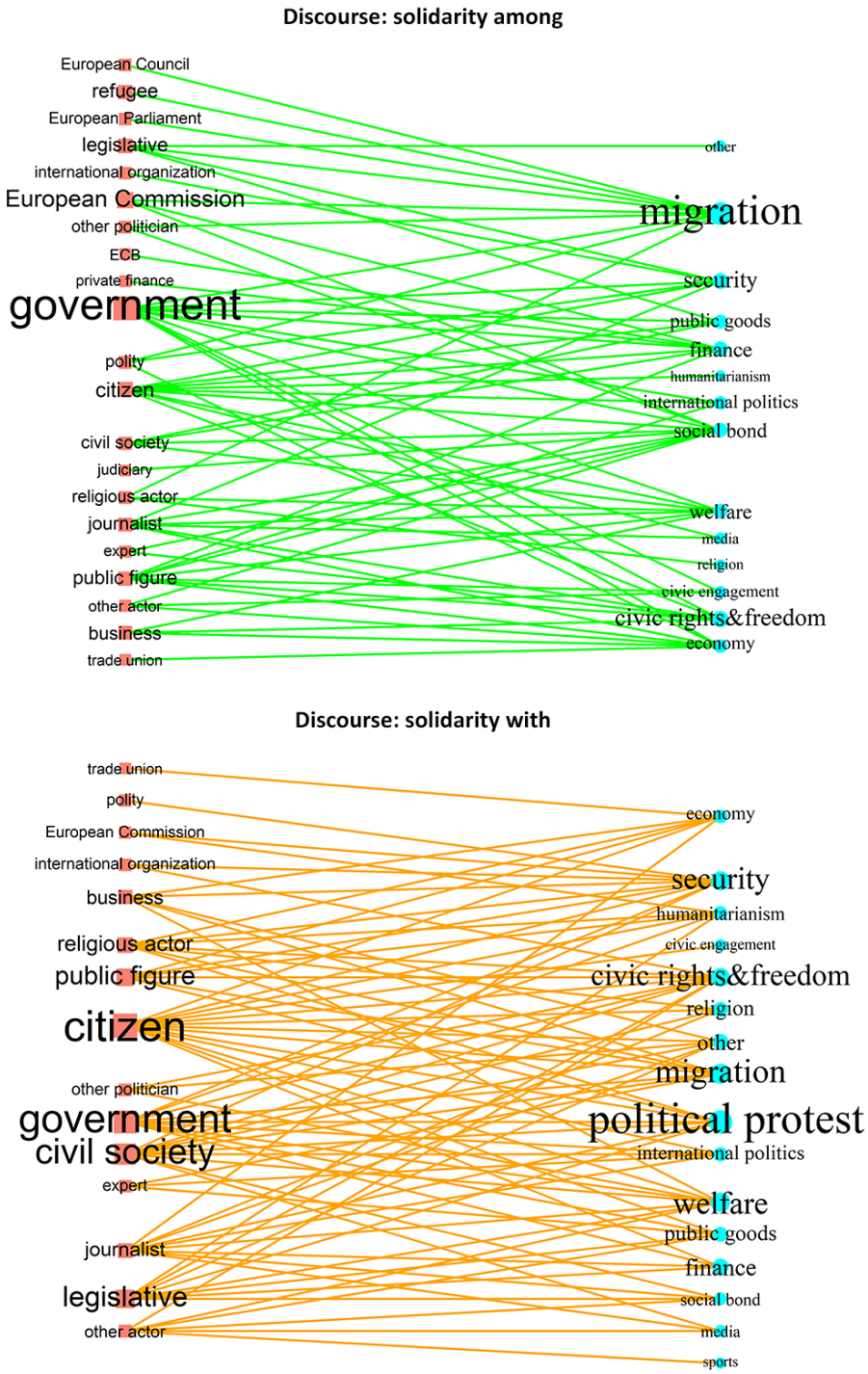

Figure 2. Solidarity relations in the German discourse network, 2008–2017. Note: The red squares are actor groups and the blue circles are issues. The bigger the node and the label, the more central the node is in the discourse network, based on eigenvector centrality. The green edges are 'solidarity among' statements while the orange edges are 'solidarity with' statements. The edge weight is dichotomized in both networks, meaning that the weight of the edges is either one (existing dyad) or zero (non-existing dyad).

5.2. Issue Centrality in the Solidarity Discourse

The next step of our analysis differentiates the solidarity discourse into three time periods. Following our initial expectation that times of crisis are times of solidarity and that they might relate to different types of solidarity, we computed the discourse networks for three time periods: the Global Recession in the years 2008–2009 (Figure 3), the Euro crisis from 2010 to 2014 (Figure 4), and the migration crisis in Europe from 2015 to 2017 (Figure 5). By

dividing the discourse into three distinct time periods, we can trace the presence of actors and issues over time and show the changing visibility of actors, issues and solidarity relations. The bigger the labels and nodes in the network, the more central they are in the network. The different network structures demonstrate the dynamics and shifts in the discourse.

Even though we expected a debate on solidarity in the context of the Global Recession, Figure 3 shows a rather unconnected solidarity discourse. There are several issues that gained public attention such as emphasizing solidarity among NATO members (security), calls for solidarity actions with the poor and marginalized groups in need (welfare) or diverse calls for solidarity with protest movements across the globe (political protest). Interestingly, the global financial crisis was not prominently covered as an issue of solidarity. Moreover, the distribution of claims on external (solidarity with) or internal (solidarity among) solidarity is almost even. Therefore, we conclude that the first time period has not supported our expectation of a unifying crisis-solidarity nexus; rather it has shown that calls for solidarity are raised in very different contexts. The second time period (2010–2014, Figure 4) not only shows an increasing number of edges and nodes in the discourse network, but also suggests that these actors and issues are more interconnected. We identify three key issues in the solidarity debate: claims on solidarity in the Euro crisis, solidarity calls regarding protest movements, and a diverse set of appeals to solidarity that refer to the protection and defense of civic rights. The appearance of these issues supports the link between crisis and solidarity, but underlines that multiple, simultaneous crisis experiences resonate in the public. Instead of having one debate on solidarity, the discourse is separated into different debates that refer to specific aspects and issues. The solidarity debate in the Euro crisis is about how supportive EU member states are to each other and under which conditions that helps to overcome the financial and economic crisis in the EU. The claims to solidarity during the Arab Spring in 2011, support for protesters in Turkey or the struggle for women's rights in Russia by the Punk Band Pussy Riot demonstrate the global appeal to solidarity as an issue to support marginalized actors in their struggle

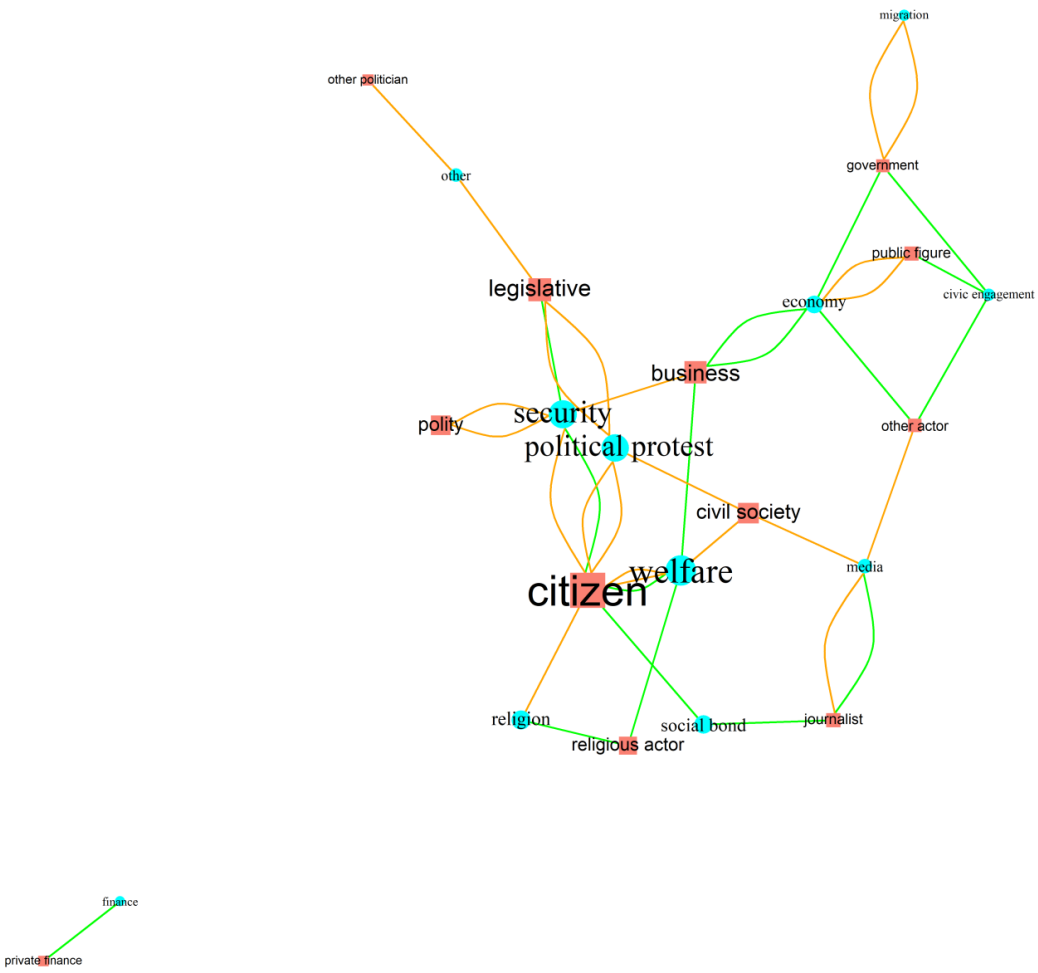

Figure 3. German solidarity discourse in German newspapers in 2008–2009. Note: The red squares are actor groups and the blue circles are issues. The bigger the node and the label, the more central the node is in the discourse network, based on eigenvector centrality.

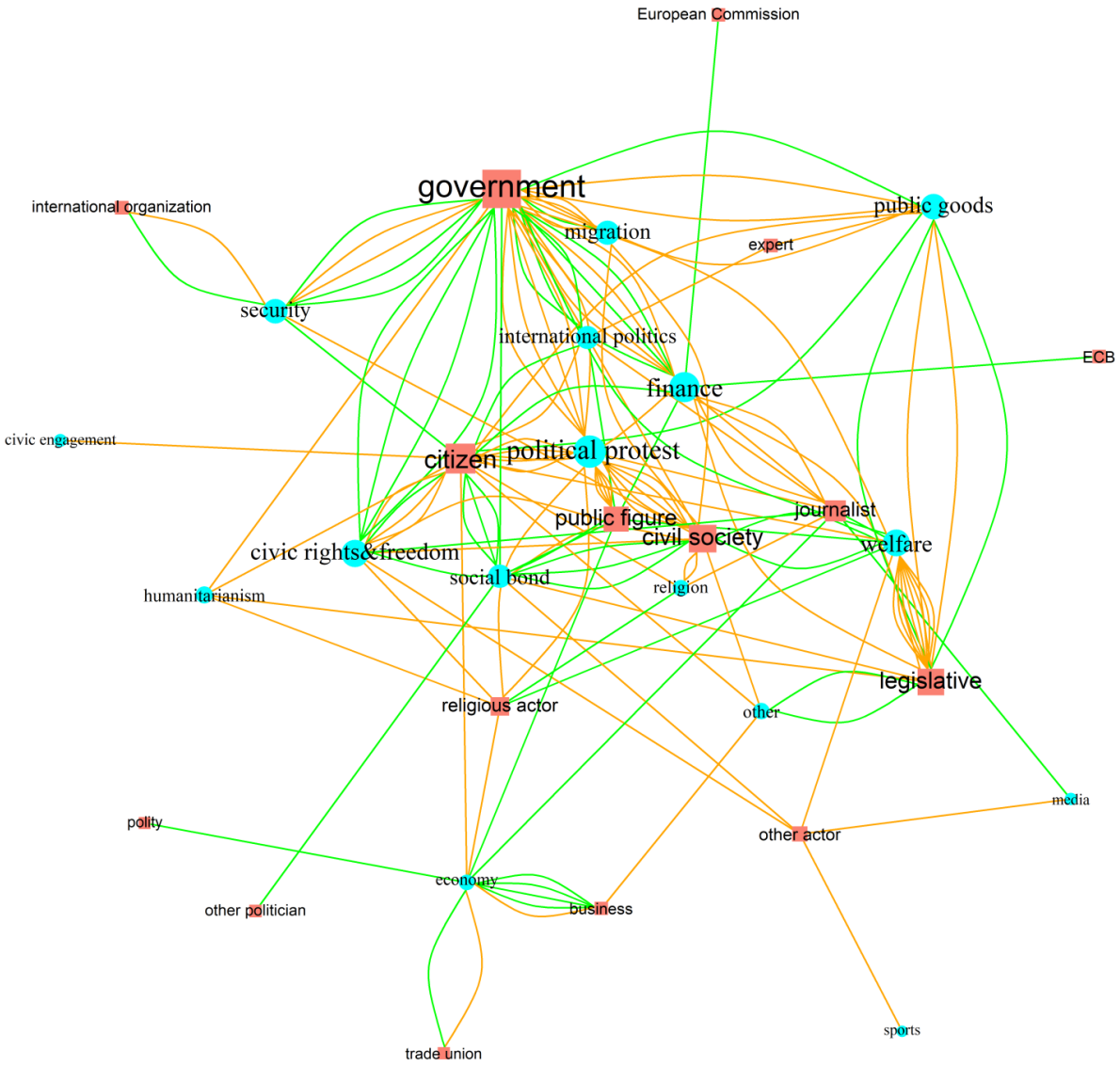

Figure 4. German solidarity discourse in German newspapers in 2010–2014. Note: The red squares are actor groups and the blue circles are issues. The bigger the node and the label, the more central the node is in the discourse network, based on eigenvector centrality.

against authoritarian political elites and for a more just and solidary society. This is supported by the strong presence of 'solidarity with' claims in these issues. Solidarity statements mainly refer to groups and actions that are beyond the claimants' own social groups and that articulate a connection with others and support them in their fight. Regarding the appearance of actors, we also demonstrate a shift towards institutionalized actors such as government and legislators, while citizens and civil society actors are still present in the solidarity discourse. Since the Euro crisis was predominantly managed on the intergovernmental EU level of national governments as well as in national parliaments (especially in the German Parliament), it comes as no surprise that national executives and parliamentarians become more visible in the second time period of the solidarity discourse.

The last time period (2015–2017, Figure 5) predominantly features three broad issues: the topic of migration during Europe's migration crisis, calls for solidarity after terrorist attacks, and solidarity claims with the opposition in the Ukrainian and Syrian conflict. The migration crisis has dominated the public debate from summer 2015 onwards and placed the issue of migration and refugees at the top of public concern. Thus, questions of how to deal with incoming migrants in Europe, reforming the Dublin system and potentially establishing a refugee relocation scheme across EU member states put solidarity in the public spotlight. Solidarity calls are at the heart of this debate, because, on the one hand, solidarity with refugees is expressed by many different actors. Actors showed their sympathy and empathy and the media reported these in a favorable manner. On the other hand, solidarity was also present in the debate on how solidarity among the EU member states should be enacted by reforming the Dublin system or installing a relocation scheme that distributes refugees across the EU.

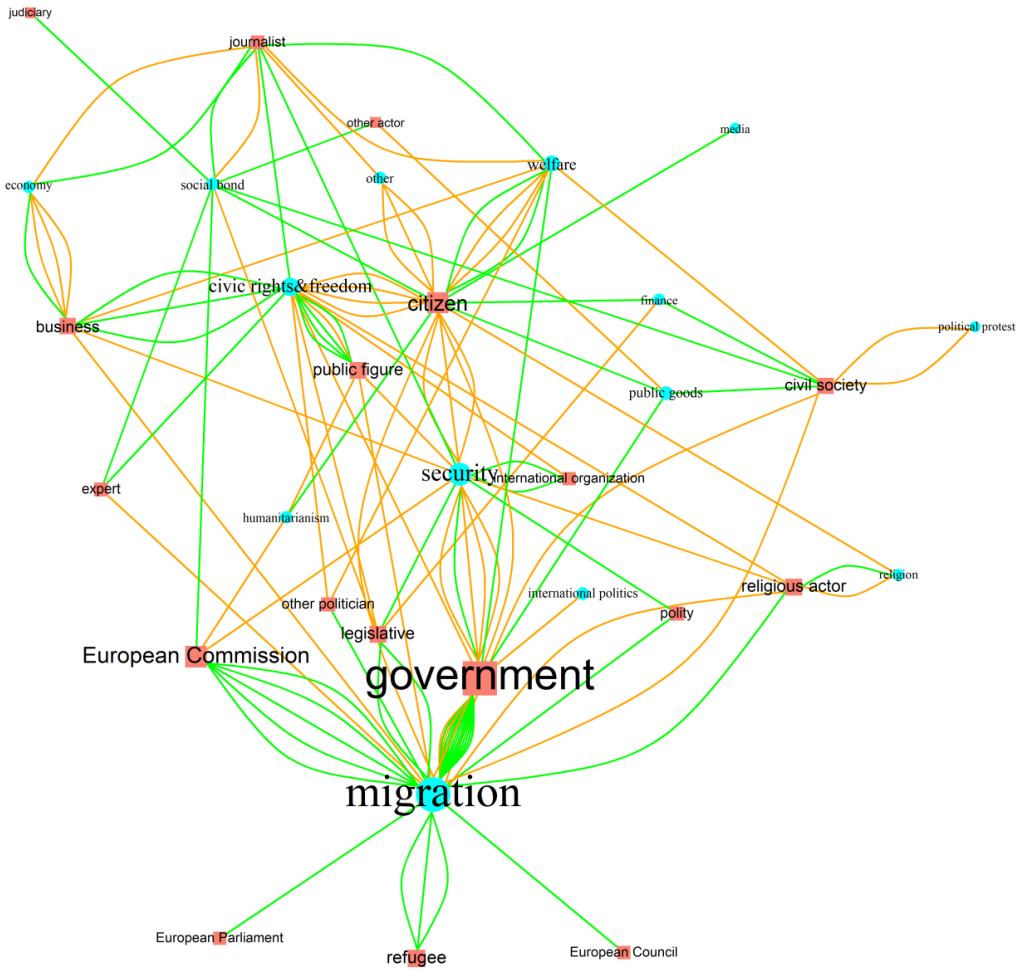

Figure 5. German solidary discourse in German newspapers in 2015–2017. Note: The red squares are actor groups and the blue circles are issues. The bigger the node and the label, the more central the node is in the discourse network, based on eigenvector centrality.

Hence, we demonstrate that the discussion of solidarity in the migration crisis is split into two debates: a 'solidarity with'-discussion regarding migrants and a 'solidarity among'-discussion regarding national governments in the EU.

Figure 6 displays the discursive oscillations in the appearance of issues by tracing the eigenvector centrality for each issue that has appeared at least once among the three highest ranked issues in one of the selected time periods. It shows a rather volatile discourse structure because the visibility of the selected issues changes quite strongly between the three time periods. We distinguish three main trends: a rise and fall of an issue, a steady increase, and a relatively stable presence of issues. Most of the selected issues match with the first trend. Political protest, finance and civic rights issues start from a low visibility in the solidarity discourse, then gain public attention due to different crises (global protest dynamic in authoritarian regimes, Euro crisis), but their visibility decreases again because the protests have succeeded (or not) or the Euro crisis has calmed down in the public debate. The second trend is linked to the increasing visibility of migration. While it was hardly an issue in the first time period, the increasing eigenvector centrality indicates the higher public awareness of solidary actions in relation to the migration issue and finally, the years 2015–2017 show the public omnipresence of solidarity claims. The last trend refers to welfare and security issues. While both issues have a high visibility in the first time period (2008–2009), their public presence decreases over time, but not as strongly as in the first trend. While security issues are linked to debates on solidarity among NATO members and showing solidarity after terrorist attacks, the welfare issue refers to social policy issues as well as discussions on supporting poor people and having fairer and more solidary welfare arrangements.

6. Conclusion

This article has investigated the solidarity discourse in German print media from 2008 to 2017. Our main aim was to provide a longitudinal perspective on the use of solidarity as well as the issue and actor visibility in

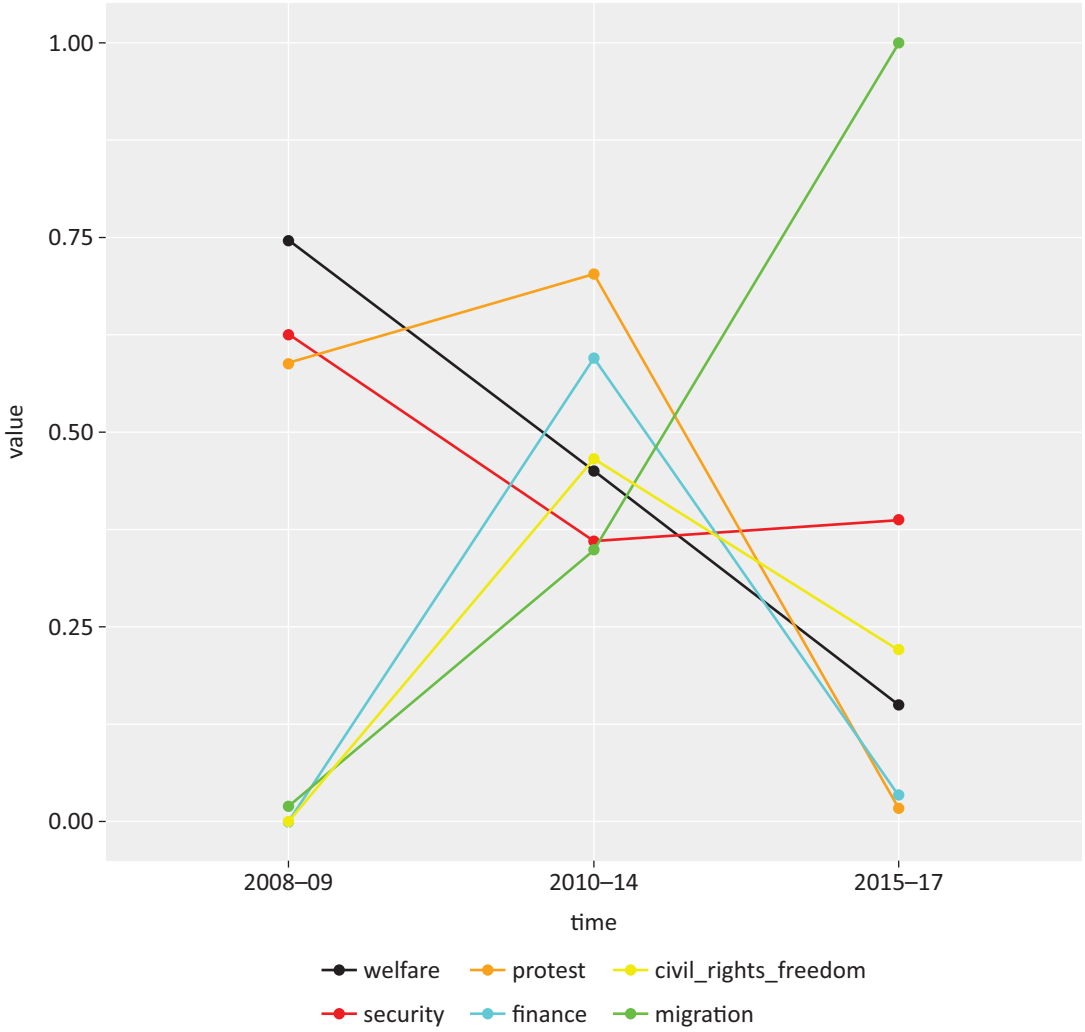

Figure 6. Most central issues in the German solidarity discourse in 2008–2017. Note: Only those issues are displayed which were among the three highest ranked issues (based on eigenvector centrality) in the respective time period. If an issue has a value of zero, then it is either very marginal or has not appeared in the respective time period.

public discourses. We conducted a discourse network analysis to map the interconnectedness of actor and issue appearance and identify the presence of different types of solidarity, namely 'solidarity among' and 'solidarity with.'

The descriptive results show that the term solidarity is used far more often by left-leaning newspapers in contrast to conservative newspapers. This suggests that the term is not 'empty' but rather carries different meanings. This finding is in line with historical research showing that solidarity developed as a pivotal political value and is one of the key concepts in current political affairs (Stjernø, 2009).

Reflecting our theoretical expectations, we discuss our three main findings. *First*, the solidarity discourse in German media predominantly follows the similar media logic that previous studies have shown regarding the dominance of national executives in newspapers and the weak visibility of international and European actors in national public spheres (Koopmans, 2007; Lahusen et al., 2016). The continuing presence of citizens and civil society groups in the solidarity discourse is, however, a unique finding. It underlines the practice and use of solidarity in citizens' communication and behavior. Solidarity is an elitist concept with a strong 'normative baggage,' but it also has an everyday meaning to non-academic citizens who may participate in a demonstration, who may criticize increasing social inequalities or who may demand more solidary actions from political actors. This finding contributes to the normative debate on the Europeanization of the public sphere and how non-institutionalized actors might play a crucial role in this process (Liebert, 2009; Statham & Trenz, 2013).

Second, solidarity is a crisis-dependent concept in the public discourse. In years of turmoil, solidarity is used in public discourse to make sense of a crisis and mobilize the public. If a broader crisis perception exists, as in the Euro crisis or migration crisis, the solidarity debate centers around crucial issues such as finance, migration or political protest and most of the actors refer to them. If this is not the case, as we have shown in the first time period (2008–2009), then the

solidarity debate is rather fragmented and actors and issues are less connected to each other. One reason why the Global Recession has not sparked a debate on solidarity in Germany might be that the US was at the center of attention and that the German government acted quickly to reassure German citizens that they will not lose money by bailing out German banks (e.g., HypoRealEstate or Commerzbank). Hence, the public conflict over whether solidarity was needed did not receive attention in 2008–2009. Nonetheless, and during the Euro crisis, we demonstrated that the debate on solidarity came to the fore.

Third, solidarity is context-sensitive. We underlined this by differentiating between 'solidarity with' and 'solidarity among' as two key solidarity relations. While both types of solidarity relations (44% to 56%) are used in the German solidarity discourse, we highlight that issues such as political protest or humanitarianism favor 'solidarity with'-statements, namely supporting protests in various countries and different social movements across the globe. Conversely, social bond issues or civic engagement—which, however, are rarely discussed in the overall discourse—show a tendency towards 'solidarity among'-statements. These claims are targeted towards the in-group and supposedly increase the loyalty among the group members. The migration issue tends towards 'solidarity with'-relations in the public debate, but a discursive divide regarding the use by actors can be identified: While government actors almost exclusively refer to 'solidarity-among'-relations in their statements on migration, other actors prefer the use of 'solidarity with' in their public claims. The former type predominantly refers to the solidarity debate among members of the EU and the question of whether a solidary and fair relocation scheme among the EU countries should be implemented. The latter type expresses the expected support of refugees and asylum seekers in Europe's migration crisis. Hence, our findings suggest that the debate on migration is explicitly split into two different types of solidarity.

We acknowledge that the study bears some limitations in terms of comparability, sampled data and methodology. From a comparative perspective, analyzing only the German case limits the generalizability of the results. Future research should use comparative research designs to detect potential differences between national contexts. From a data perspective, our study only investigated daily quality newspapers. This sample arguably covers a rather small portion and elitist-centered part of the public sphere. We are well aware of this limitation. However, since quality media strongly influence and mobilize the public, and since most of the actors try to be as visible as possible in these quality media outlets, our decision to focus on these media is justified. Nevertheless, future studies should analyze other forms of offline and online communication on solidarity such as blogs, social networking sites or parliamentary debates to get a better understanding of the meaning and use of solidarity in public discourses. From a methodological perspective, the discourse network approach showed its applicability beyond its utility for policy debates as previous studies have shown (Leifeld, 2016; Leifeld & Haunss, 2012). It emphasizes the dynamics and interrelations between actor appearance and issue visibility. However, the discourse network approach also made it necessary to work with aggregated codes for the actors such as government or civil society. Otherwise, the discourse networks would have shown a large number of nodes that only appear once or twice in the whole time period, visualizing a rather sparse network. Public debates on contested concepts such as solidarity do not have this policy discourse structure with clear, identifiable, and a rather limited number of policy opponents as well as distinctive policy conflicts. Thus, our analyses of the public debate might provide another methodological challenge for the discourse network analysis, when it attempts to capture a rather volatile and dynamic public discourse in future studies.

Tracing the meaning of concepts such as solidarity in media debates over time is highly relevant in order to understand the dynamics of public discourses and to make sense of the different meanings that concepts might contain. We have demonstrated that the solidarity debate is influenced by crises, but is not entirely determined by them, and this finding might be scrutinized in future studies in greater detail.

Acknowledgments

The authors would like to thank the participants of the seminar "Discourses on Solidarity" held in 2018 at the University of Düsseldorf as well as the anonymous reviewers and the Academic Editor Philip Leifeld for detailed comments and suggestions on the manuscript. We also acknowledge financial support by Stiftung Universität Hildesheim.

Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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COGITATIO

Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 272–285
DOI: 10.17645/pag.v8i2.2610

Article

Incumbents' Strategies in Media Coverage: A Case of the Czech Coal Policy

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Submitted: 31 October 2019 | Accepted: 29 February 2020 | Published: 2 June 2020

Abstract
Transitioning to a decarbonized economy is a crucial part of climate change mitigation, with the phasing-out of coal, as the most significant source of carbon dioxide emissions, being the centerpiece of this effort. In the European context, the increasing pressures exerted especially on the basis of the European Union's energy and climate policy, coupled with the inherent uncertainty of the transition process, encourage various struggles among the involved policy actors over the setting of specific transition pathways. One site of such contestation is media discourse, which may facilitate or limit policy change through agenda-setting, framing, and other processes. Importantly, discursive struggles also include industry incumbents, who have a vested interest in preserving the existing sociotechnical regime. This article focuses on the position of incumbents in terms of their relationship with governing political parties and the discursive strategies they employ. It explores the policy debate on coal mining expansion which took place in 2015 in the Czech Republic, a post-communist country with a coal-dependent economy, a skeptical position on energy transition, and a powerful energy industry. The research employs discourse network analysis to examine a corpus compiled from daily newspapers and applies block modeling techniques to analyze patterns of relationships within and between actor groups. The results show that incumbents successfully prevented policy change in the direction of rapid coal phase-out by exploiting discourse alignment with governing parties and efficiently employing discursive strategies based primarily on securitization of socioeconomic issues.

Keywords
coal; Czech Republic; energy; discourse network analysis; media discourse; newspapers; public policy

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

Transition to a decarbonized economy is a crucial part of climate change mitigation efforts. Coal, which has been used as a reliable and cheap energy source since the beginning of the industrial revolution, now accounts for 27% of global primary energy supplies, and its share in total CO_2 emissions is 44% (International Energy Agency, 2018). Thus, energy transition requires a rapid coal phase-out. The European Union has devised a plan to stop coal production over a horizon of 25 to 50 years (European Commission, 2017), which generates pressure especially on incumbent coal producers who resist and negotiate such change (Geels, 2014). The nature and pace of energy transition is thus contested by diverse policy actors and their coalitions who compete to influence the related policy process (Markard, Suter, & Ingold, 2016; Ocelík et al., 2019).

Mass media are an integral part of this struggle as they provide visible sites for policy debates on transition-related challenges, thus defining for audiences what are (non)legitimate policy responses and who authoritatively speaks about them (Johnstone, Stirling, & Sovacool, 2017; Stoddart & Tindall, 2015). Likewise, Leifeld (2013) argues that policy actors' media struggles constitute a "discursive layer of subsystem politics" and actors can be classified into "coalitions of competing policy beliefs" through which they promote their inter-

ests (see Hajer, 1995; Sabatier, 1988). Shanahan, Jones, and McBeth (2011) contend that coalitions generate and strategically use particular narratives tailored to promote preferred policy outcomes. Consequently, political discourses affect agenda-setting processes, public opinion dynamics, and policy actors' interactions, and have the potential to facilitate particular policy outcomes (Leifeld, 2017). More generally, a discursive shift where one dominant coalition is replaced by another is considered a precondition of major policy change (Hajer, 1993; Leifeld, 2013; Shanahan et al., 2011). Thus, the study of political discourses is critical for better understanding energy transitions requiring major policy changes.

In this research, we present a single-case study that examines (1) whether energy industry incumbents, i.e., actors that benefit most from the prevailing system (Smink, 2015), aligned with governing political parties, and (2) what discursive strategies incumbents employed to prevent policy outcomes from facilitating coal phase-out (Johnstone et al., 2017). The case is one of a mature, adversarial policy subsystem (Weible, 2008) with a well-established coalition structure consisting of two competing coalitions (see Ocelík et al., 2019). Based on the above, the overarching research question is the following:

> RQ: How did the position of incumbents in the media discourse on coal phase-out evolve over the course of the year 2015?

To that end, we use discourse network analysis (Leifeld & Haunss, 2012), which allows us to capture actors' discursive interactions over time. We analyzed a media coverage corpus consisting of the relevant articles from daily newspapers in the Czech Republic. To examine discourse alignment between incumbents and governing parties, we used deductive block modelling (Saunders, 2009).

This research strives to make two contributions. Firstly, by linking policy process (Leifeld, 2016; Sabatier, 1988) and energy transition literatures (Geels, 2002; Johnstone et al., 2017), it explores the role of incumbents in preventing transition-oriented policy change through discursive interactions. Secondly, the research brings novel empirical evidence on a major European coal consumer which is neither committed to a specific phase-out pathway (such as Germany), nor actively opposing that policy option (such as Poland; see Lehotský, Černoch, Osička, & Ocelík, 2019; Osička et al., 2020).

2. Theory: A Discursive Layer of Energy Transition

Energy transition constitutes a major technological transformation in the way fundamental societal functions are fulfilled, such as housing, transportation or feeding (Geels, 2002). Such change is, nevertheless, limited by path-dependencies of an established socio-technical regime—a set of embedded rules and practices that enables and constrains actors in relation to the existing energy system (Geels, 2014). Thus, the formulation of specific transition pathways assuming different cost and benefit structures is being contested by diverse policy actors and their coalitions (Markard et al., 2016). In this context, we use the Advocacy Coalitions Framework (Sabatier, 1988), which posits that policy processes involving various interdependent actors take place mostly within specific policy subsystems defined by particular issue areas. It further assumes that since actors cannot achieve most of their goals alone, they tend to form 'coalitions of the like-minded' centered around highly salient policy beliefs concerning how the policy subsystem should be organized (Henry, Lubell, & McCoy, 2011). Energy-related subsystems are expected to involve coalitions of right-wing and industry organizations, with the principle actors being incumbents, vis-à-vis coalitions of left-wing and environmental organizations, with the principle actors being environmental NGOs (ENGOs; see Ingold, Fischer, & Cairney, 2017; Ocelík et al., 2019). Industry incumbents possess superior organizational resources and privileged access to decision-making authorities (Geels, 2014). ENGOs, however, try to offset their lower organizational resources and limited access to decision-making through media visibility and other outsider strategies (Dalton, Recchia, & Rohrschneider, 2003).

Weible (2008) proposed that coalition interactions are conditioned by the subsystem characteristics, specifically by the degree of policy belief compatibility and prevailing coordination patterns. Adversarial subsystems are then defined by competing coalitions with low-level between-coalition belief compatibility (Weible, Pattison, & Sabatier, 2010). Competing coalitions exercise power against each other through different means, including by shaping public opinion and thereby affecting the decision-making of political authorities (Leifeld, 2016; Weible et al., 2010). Media discourse is a key arena where diverse actors engage in policy debates and struggle to shape public understanding of contested issues (Broadbent et al., 2016; Kukkonen, Ylä-Anttila, & Broadbent, 2017; Leifeld, 2013). Thus, coalitions strive to promote their narratives designed to convince other actors about a particular policy position (Shanahan et al., 2011). To capture coalition dynamics at the discourse level, we employ the concept of 'discourse coalitions,' defined as "groups of actors who share a social construct" (Hajer, 1993, p. 43).

To resist regime change, incumbents use instrumental, institutional, material, and discursive strategies (Geels, 2014). Instrumental strategies employ various actor-specific resources such as positions of authority, money, or access to media in direct interactions with other actors to pursue their interests. Lobbying government to promote regime protection policies is an example of this strategy. Institutional strategies are based on resonance of incumbents' actions and interests with deeper ideological and governance structures that thereby assist in resistance to regime change. Paternalistic decision-making dominated by technical

and economic expertise, traditionally 'owned' by incumbents, is a component of such institutional context (see Osička & Černoch, 2017). Material strategies then utilize technical capabilities and financial resources to maintain and improve the technical dimension of the current socio-technical regime. For instance, investments in carbon-intensive technologies reinforce technological lock-in and path-dependencies, which in turn structurally condition policy choices. Geels (2014) gives the example of carbon capture and storage technology, which has also significantly contributed to a 'clean coal' discourse. Finally, discursive strategies focus on shaping public discourses in order to establish a regime-protective dominant discourse. This allows incumbents to control the complementary processes of agenda-setting (McCombs & Shaw, 1972), i.e., what is discussed, and framing (Snow & Benford, 1988), i.e., how is it discussed.

Johnstone et al. (2017) offer a useful typology of 'incumbents' strategies' that allows to further distinguish the specific ways they shape public and policy discourses to secure their interests. First, 'securitization' frames the incumbents' interests, such as expansion of coal mining, as matters of national or regional security. Appeals to supply security that contrast coal as a reliable domestic source to import dependency-inducing natural gas or volatile renewables would be consistent with such strategy. Second, 'reinvention' reframes the current regime and its core components in a way that appears new or innovative. So-called clean coal technologies are a prime example here. Third, 'masking' suppresses, socializes or externalizes the full costs of the incumbent regime. For example, incumbents typically choose to be silent on issues of the environmental degradation and health impacts of coal mining. Fourth, 'capture' promotes incumbents into positions of political or regulatory power. In this respect, the 'revolving doors' phenomenon blurs distinctions between public and private interests, making it unclear who speaks for whom (Johnstone et al., 2017).

3. Data and Methods

The analyzed corpus consists of all articles concerned with the topic in the major national newspapers which satisfy the 'quality press' criterion (Leifeld, 2013) as well as regional newspapers in the impacted regions: *Karlovy Vary*, *Liberec*, *Plzeň*, and *Ústí nad Labem*. Specifically, this included all four major daily newspapers *Mladá fronta Dnes*, *Právo*, *Lidové noviny,* and *Hospodářské noviny*, peripheral *Haló noviny* (closely linked to the Communist Party); and 11 regional newspapers (*Deník*) issued under Vltava Labe Press publishing house. The editorial ideology of the major national newspapers ranges from the traditional social-democratic perspective of *Právo*, through *Mladá fronta Dnes'* centrist position, to the liberal right in the case of *Lidové noviny* and *Hospodářské noviny* (for more, see Volek & Urbániková, 2017). It is worth noting that then chairman of junior governing party ANO 2011 and Finance Minister Andrej Babiš acquired the MAFRA publishing house that issues *Lidové noviny* and *Mladá fronta Dnes*.

Data was collected through the Anopress IT Czech media monitoring database (Anopress, n.d.) based on the following keyword search query (English/Czech keyword): *coal/uhlí <AND> ((mining/těžba <AND> limits/limity) <OR> energy industry/energetika <OR> limits/limity)*. The query construction avoids too narrow focus by adding keyword phrase energy industry, which allows us to capture incumbents' discursive strategies that do not explicitly mention the mining limits—such as statements on the role of coal in the energy mix. The time frame was set between 1 January 2015 and 21 October 2015 to cover the policy debate on the mining limits between the government's announcement of the reevaluation process and its final decision.

All articles were read and their contents manually coded if actor statements (1) referred to relevant policy positions or responses (e.g., 'mining limits need to be preserved') or (2) represented normative evaluations of relevant issues (e.g., 'coal mining has severe environmental impacts'; Koopmans, 2002). Both direct and indirect (reported) statements have been coded. The coding was done in Discourse Network Analyzer (Leifeld, 2019). Each coding unit (statement) was defined by four variables: concept, organization, person (if available/relevant), and dis/agreement with the concept. Although coding allowing to test inter-coder reliability was not applied, we used the following procedure to increase data quality. Firstly, an initial coding scheme consisting of a smaller number of concepts derived from literature was formulated. Secondly, a multipass coding strategy where a single coder navigates back and forth between the statements in order to increase coding consistency was employed (Leifeld, 2013). There was a first reading of the corpus followed by regular meetings with the second researcher during which ambiguities in the coding were addressed and resolved. This included revisions of the coding scheme to reflect new information. Lastly, there was a joint discussion on classification of the concepts under the incumbents' discursive strategies (see Table 1).

The coding of 705 relevant articles yielded 890 coding units with 34 concepts and 43 organizational actors (for more information, see Appendix 3 of the Supplementary File). The actors were classified under four categories: (1) incumbents, (2) governing parties, (3) ENGOs, and (4) none of the above (residual group). This classification reflects the focus on the relationship between the incumbents and governing parties while controlling for the main regime challengers, ENGOs. Governing parties were Social Democrats, ANO 2011, and Christian Democrats. Incumbents were defined as organizations that mostly benefit from the current regime (see Smink, 2015) and would directly profit from the mining expansion. Preserving the limits, to the contrary, would incur costs to them. The incumbents include state-owned energy company ČEZ Group and its subsidiary North Bohemian Mines, private min-

Table 1. Incumbents' discursive strategies: Classification scheme.

Strategies	Concepts
Capture	The state should be involved in coal mining (agreement)
Masking	Coal mining has no negative impacts if it does not interfere with settlements (agreement) Moving the mining further away from settlements sufficiently reduces its negative impacts (agreement) Coal mining and use of coal have negative health impacts (disagreement) Coal mining produces high negative externalities (disagreement) Rescission of limits will cause environmental degradation (disagreement)
Reinvention	The combination of underground and surface mining is less harmful (agreement) Coal is a key source for the heating industry (agreement)
Securitization	Preserving the limits will bring regional socioeconomic decline (agreement) Preserving the limits will cause serious regional unemployment (agreement) Coal is a strategic commodity (agreement) Coal is needed to replace power supplies from the nuclear-power plant *Dukovany* (agreement) According to the State Energy Policy coal beyond the limits in the ČSA mine is not needed (disagreement)

ing companies Sev.en and Sokolov Coal, as well as the Bohemian–Moravian Confederation of Trade Unions and the Heating Industry Association. Regime challengers, on the other hand, aim to disrupt and change the status quo. Nevertheless, only ENGOs have been included since countervailing industry actors, such as renewable energy companies, did not engage in the debate. The ENGOs group includes Friends of the Earth, Glopolis, Greenpeace, and Limits Are Us. Finally, though local organizations, mostly municipalities and civil associations, do not necessarily pursue regime change, some are concerned with the immediate impacts of mining expansion, such as destruction of settlements. Hence, the residual group consists of a heterogeneous set of actors such as opposition and regional political parties, research organizations, local civic organizations, and other NGOs.

The incumbents' discursive strategies were identified based on the subsequent theory-driven classification of particular concepts into four categories: capture, masking, reinvention, and securitization (Johnstone et al., 2017). We used a classification scheme consisting of 13 concepts capturing specific features of the four strategies (see Table 1). The remaining 21 concepts have not been explicitly linked to any of the strategies. Thus, occurrence of dis/agreements with particular concepts or the absence of agreement with particular concepts (masking) indicated use of a specific discursive strategy.

We extracted matrices for (1) actor congruence networks consisting of organizations and (2) bipartite (affiliation) networks consisting of organizations and concepts for all three stages. The actor congruence networks have weighted ties that represent organizations' cumulative similarity in their use of concepts. Thus, the more similar the position in the discourse, the higher the edge weight. We further used average activity normalization (Leifeld, 2013), which accounts for the presence of highly involved actors such as relevant ministries. More specifically, the edge weight is normalized by dividing its value by the average number of concepts both actors refer to, either through negative or positive statements, in the affiliation network. The threshold values for dichotomization were set in an explorative way (Leifeld, 2013). Normalized actor congruence networks were used to explore the coalition structure of discourse. We defined discourse coalitions as groups or organizations that (1) exclusively agreed or disagreed with one of the four limit rescission variants and (2) have been identified as part of a cohesive subgroup (for more information, see Appendix 2 of the Supplementary File).

The affiliation networks have weighted ties resulting from subtraction of disagreements from agreements (see Leifeld, Gruber, & Bossner, 2019). The next step was to dichotomize the underlying incidence matrices. Since we are interested in similarity patterns among organizations, we used the following threshold: if $w > 0$, then 1, otherwise 0. In other words, all positive ties were transformed to 1s and all negative ties were transformed to 0s. There are two reasons for such approach. First, we argue that more restrictive thresholds are appropriate rather for one-mode projections that tend to overestimate density and clustering than for bipartite networks. Second, a more restrictive threshold would also discard patterns of ties where actors express a low-level agreement (e.g., $w = 1$) with a large number of concepts resulting in a loss of potentially important information.

The resulting incidence matrices were used to calculate of row-based (organization-based) square similarity matrices using Jaccard's coefficient (Hahsler, 2019). Jaccard's coefficient (J) calculates the similarity of two sets (here organization profiles) as the number of common elements (intersection of the two sets) divided by the sum of the number of elements in both sets (union of the two sets). Thus, J ranges between $< 0, 1 >$ and can be readily interpreted as the percentage of overlap between the two sets, with 0 indicating no overlap and 1 complete overlap.

To examine a discourse alignment between incumbents and governing parties, we used deductive block

modelling. A block model is a simplified representation of a network that consists of groups of nodes (blocks) that have similar relations to others and similar patterns of relations among nodes and blocks (social roles; see White, Boorman, & Breiger, 1976). Deductive block modelling then involves the definition of a hypothetical model based on theoretical assumptions (see Saunders, 2009)—here, similarity of governing parties and incumbents in terms of used concepts—which provides a baseline for the observed network. Thus, each block model divided the corresponding similarity matrix into four groups based on organization membership in (1) incumbents, (2) governing parties, (3) ENGOs, and (4) none of the above (residual group). The resulting 4×4 image matrix represents the average similarity values for the within-group blocks (diagonal) and between-group blocks (non-diagonal). Thus, similarity (discourse alignment) between the two actor groups, such as incumbents and governing parties, is indicated if the corresponding between-group block average similarity value is statistically significantly higher than the overall average (network) similarity.

In order to determine whether the observed block averages statistically significantly differ from the network (overall) average, we used a permutation test. More specifically, statistical significance was assessed based on a comparison of the observed block similarities with the interval estimate of the overall average (network) similarity constructed for the 95% confidence level from a generated sampling distribution with 5,000 trials. The sampling distribution was generated based on Jaccard's coefficient measurements of the 5,000 random bipartite networks with the same number of nodes in both node sets and with a tie formation probability set to the density calculated for the dichotomized incidence matrix of the observed network.

We used R 3.3.1 (R Core Team, 2014) for data processing and analysis, specifically the packages arules (Hahsler, 2019), rDNA (Leifeld, Gruber, & Henrichsen, 2019), and sna (Butts, 2008).

4. Results

The debate on the mining limits' rescission proceeded in three stages. More specifically, the decision to review the territorial limits (see Figure 1) was part of a coalition agreement establishing the new government in early 2014 (first stage). The majority government was led by the Social Democrats and included two junior coalition partners, technocratic populist ANO 2011 and Christian Democrats. Having analyzed the situation, at the end of 2014 the Ministry of Industry and Trade proposed the following four potential options:

1. To preserve the current territorial limits;
2. To rescind the limits in the Bílina mine;
3. To rescind the limits in the Bílina mine and partially also in the ČSA mine;
4. To rescind the limits in the Bílina mine and also in the ČSA mine.

Figure 1. Territorial-ecological limits and mining sites in the North Bohemian (Most) Basin. Source: Adopted from Lehotský et al. (2019).

Initially, rescission of the limits was supported mainly by industry incumbents and the Minister for Industry and Trade. This, however, stirred a substantial public debate, and at the beginning of 2015 the two junior coalition parties decided to oppose the change. To resolve this stalemate, it was agreed that further analyses would be made to better understand the consequences of each option, to which end the government commissioned impact evaluation studies (second stage).

In May 2015, an important amendment of the State Energy Policy envisaging a shift in the energy mix from coal-based production to a greater role of nuclear energy was adopted (Ministry of Industry and Trade, 2015). Subsequently, the impact evaluation studies published at the turn of August and September (third stage) argued that only the coal reserves in the Bílina mine were needed to cover future coal demand. After these developments, the junior coalition partners changed their position, and on 19 October 2015, the government reached the decision to rescind the territorial limits in the Bílina mine (option 2). For more information, see Appendix 1 of the Supplementary File.

This section presents a description of the normalized actor congruence networks and block modelling results for each stage. The former represents organizations' belief overlap and maps coalition structure of the discourse (Leifeld, 2013), while the latter shows organizations' similarities within and across four pre-defined groups: incumbents, governing parties, ENGOs, and residual group. A summary of incumbents' discursive strategies is presented in Section 4.4.

4.1. First Stage (January–April 2015): Incumbent Mobilization

The government's announcement of the mining limits' reevaluation in early January 2015 sparked a heated debate. The actor congruence network (Figure 2) contains the largest number of actors (39) while exhibiting a marked segmentation into two competing coalitions.

The industry coalition (N = 18), led by incumbent actors Sev.en (private mining company) and the Bohemian–Moravian Confederation of Trade Unions (BMCTU), is organizationally heterogeneous and, importantly, also includes the Social Democrats (SD), which occupied the Ministry of Industry and Trade as well as the Prime Minister's Office. Another notable actor is the President of the Czech Republic Miloš Zeman (Pre), a long-term supporter of industry incumbents. Two regional political parties belong to the coalition as well, the Communist Party (CP) and populist party Dawn of Direct Democracy (DDD). Having traditional ties to the coal mining regions, the Social Democrats are by far the most active, with 106 statements, while the private coal mining company Sev.en ranks second with 55 statements. The industry coalition emphasizes socioeconomic benefits of mining expansion, especially in terms of job security, mining royalty incomes, and regional development.

The environmental coalition (N = 14) consists of ENGOs, grassroots organizations, local municipalities, research organizations, the Green Party, and four local organizations of political parties. The local Green Party organization in Horní Jiřetín (GP-J), a municipality at risk

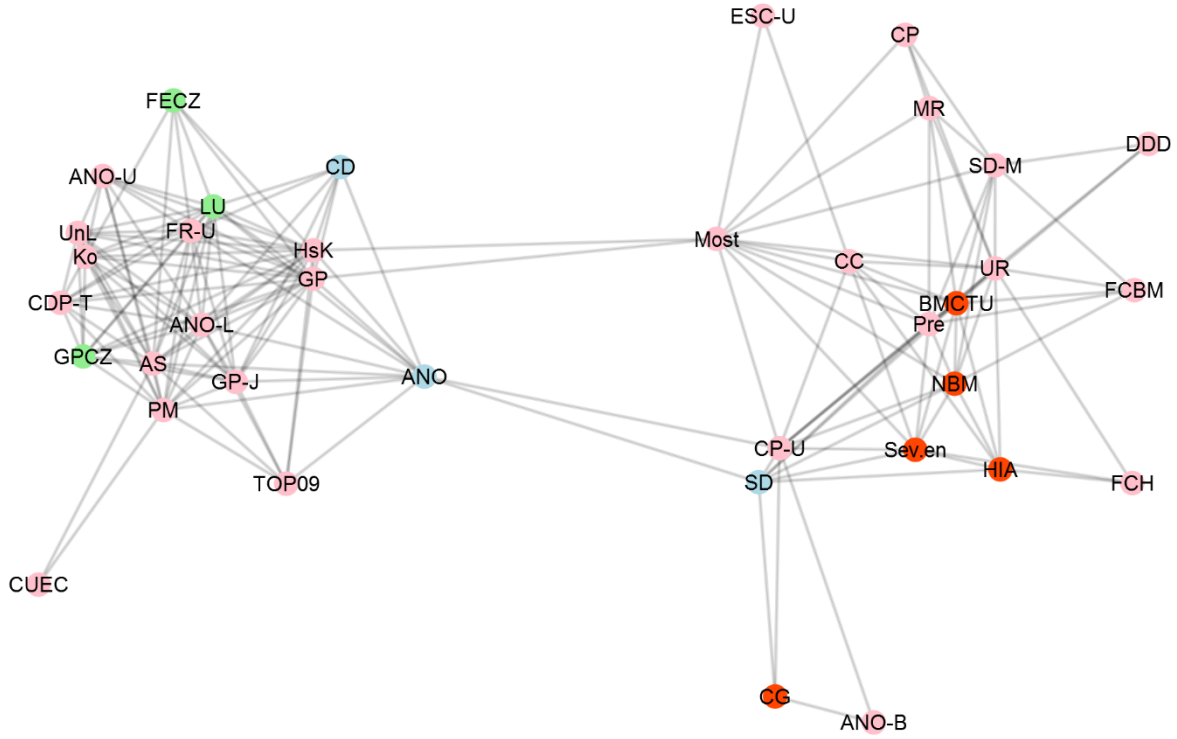

Figure 2. Normalized actor congruence network (w > 0.727). Notes: Incumbents are coded as red, governing parties as blue, ENGOs as green, and residual actors as pink. Isolates are not displayed.

of destruction in more extensive variants of the limits' rescission, is the most active with 17 statements. The coalition promotes counter-arguments based primarily on negative environmental and health impacts, other concepts are represented only marginally.

The other two governing parties, the Christian Democrats (CD) and ANO 2011 (ANO), for which the mining limits represent a less important issue, are positioned between the two coalitions. Both parties acknowledge arguments concerning socioeconomic benefits as well as negative environmental and health impacts.

The blocked actor Jaccard's similarity matrix (see Table 2) shows a statistically significantly higher similarity between the incumbents and the governing parties (block 1–2) as well as between the governing parties and ENGOs (2–3). To the contrary, the between-group block 1–3 involving the incumbents and the ENGOs exhibits statistically significantly lower similarity approaching a zero-belief overlap. Except the block 3–4, all other between-group blocks are not statistically significantly different from the overall average (J = 0.092). Lastly, all within-group similarity values are statistically significantly higher indicating relative cohesiveness of the four actor groups. These results provide supportive evidence for the presence of two discourse coalitions with a low belief overlap led by the incumbents and ENGOs. They further show that incumbents aligned with the governing parties already in the initial stage of the policy debate.

4.2. Second Stage (May–August 2015): Incumbent Retreat

The second stage, marked by the amendment of the State Energy Policy in May 2015 (Ministry of Industry and Trade, 2015), shows a very different picture where only the most active of actors remain present. In comparison to the previous stage, the actor congruence network (Figure 3) is less segmented and contains only 17 actors. The governing parties (Social Democrats and ANO 2011) remained centrally located and bridged between the incumbents and a cluster of environmental and local actors.

The industry coalition (N = 5) includes only one incumbent actor (the Bohemian–Moravian Confederation of Trade Unions, BMCTU); three political parties (Social Democrats [SD], a regional organization of the Communist Party, Ústecký [CP-U], and a local organization of ANO 2011 [ANO-B]); and the municipality of Mariánské Radčice (MR). Interestingly, the remaining incumbent actors, i.e., the mining companies North Bohemian Mines (NBM) and Sev.en, have not been vocal in terms of public support of the rescission. This could be interpreted in a way that they preferred rather instrumental strategies since the final decision was made at the governmental level. As in the previous stage, the group articulated issues referring mostly to the negative socioeconomic impacts resulting from preservation of the limits, especially those of regional unemployment and supply shortages in the heating sector.

The environmental coalition (N = 5) consists of ENGO Limits Are Us (LU), the Green Party (GP), the regional political party North Bohemians (NB), the local Green Party organization in Horní Jiřetín (GP-J), and the municipality of Litvínov (Lit). The Limits Are Us organization was established directly in response to the governmental proposal to rescind the mining limits and soon started a public campaign based mostly on direct action. Thus, its repertoire of contention differs from longer-established ENGOs such as Greenpeace and Friends of the Earth, who rely more on media campaigns and advocacy. The absence of these organizations is rather surprising and indicates their reactive position in the debate. The coalition maintained its focus on local environmental and health impacts of coal mining.

The governing party ANO 2011 remains in a bridging position between the two coalitions, while the Christian Democrats are not present. This might be related to the fact that the Christian Democrats' electoral base in the concerned regions is weak.

The blocked actor Jaccard's similarity matrix (see Table 3) showed a markedly different pattern in comparison to the previous stage. The results indicate that the discourse alignment between the incumbents and governing parties (block 1–2) has not been stable over time and incumbents might have chosen to avoid confrontation in media. It should be noted that, the different variants of the limits' rescission (see Section 3) would have substantially different implications for the individual incumbents. For instance, the partial rescission in variant 2 was beneficial for the state-owned ČEZ Group but would keep the limits in place at the ČSA mine, owned by the private company Sev.en. Thus, the incumbents' positions became fragmented, as the statistically significantly lower similarity value of their within-block (1–1) shows (overall average J = 0.129). The ENGOs have not been successful to shift the views of ANO 2011 or the

Table 2. Block model: Reduced Jaccard's similarity matrix (January–April 2015).

	1. Incumbents	2. Governing parties	3. ENGOs	4. Residual group
1. Incumbents	**0.168**			
2. Governing parties	**0.132**	**0.290**		
3. ENGOs	**0.008**	0.104	**0.181**	
4. Residual group	0.082	0.104	**0.159**	**0.166**

Notes: The cells represent Jaccard's similarity values for the corresponding blocks. The cell values statistically significant at $p < 0.05$ level are in bold.

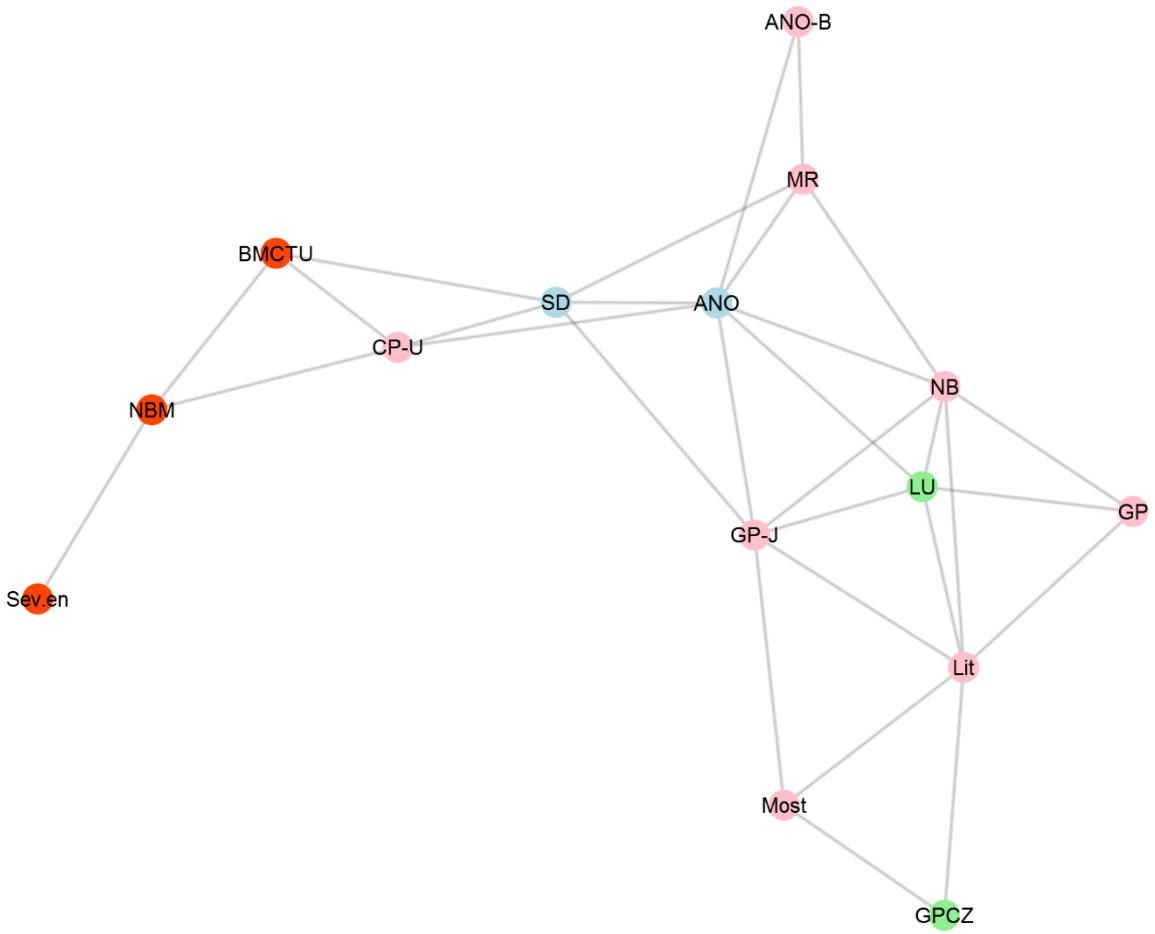

Figure 3. Normalized actor congruence network (w > 0.439). Notes: Incumbents are coded as red, governing parties as blue, ENGOs as green, and residual actors as pink. Isolates are not displayed.

Christian Democrats in their favor, and thus have moved to a peripheral position.

4.3. Third Stage (September–October 2015): Incumbent Dominance

The publication of the impact studies at the turn of August and September 2015 revived the debate as actors began commenting on its conclusions and recommendations until the government's final decision on 19 October 2015. The actor congruence network (Figure 4) contains 25 actors who are, similarly as in the first stage, segmented into two competing coalitions.

The industry coalition (N = 12) now consists of two out of the three governing parties (Social Democrats and Christian Democrats) as well as incumbent actors, specifically state-owned energy utility ČEZ Group, Heating Industry Association, and the Bohemian–Moravian Confederation of Trade Unions. The group further includes Czech president Miloš Zeman (Pre), as well as the Communist Party both at the national and regional level (CP-U), a chamber of commerce (CC), a regional authority (ESC-M) and two municipalities (Mariánské Radčice [MR] and Most). The coalition maintains its socioeconomic development narrative while highlighting the argument that mining expansion is necessary for securing

Table 3. Block model: Reduced Jaccard's similarity matrix (May–August 2015).

	1. Incumbents	2. Governing parties	3. ENGOs	4. Residual group
1. Incumbents	**0.056**			
2. Governing parties	0.106	**0.200**		
3. ENGOs	**0.000**	0.111	**0.000**	
4. Residual group	**0.031**	**0.089**	**0.210**	0.124

Notes: The cells represent Jaccard's similarity values for the corresponding blocks. The cell values statistically significant at $p < 0.05$ level are in bold.

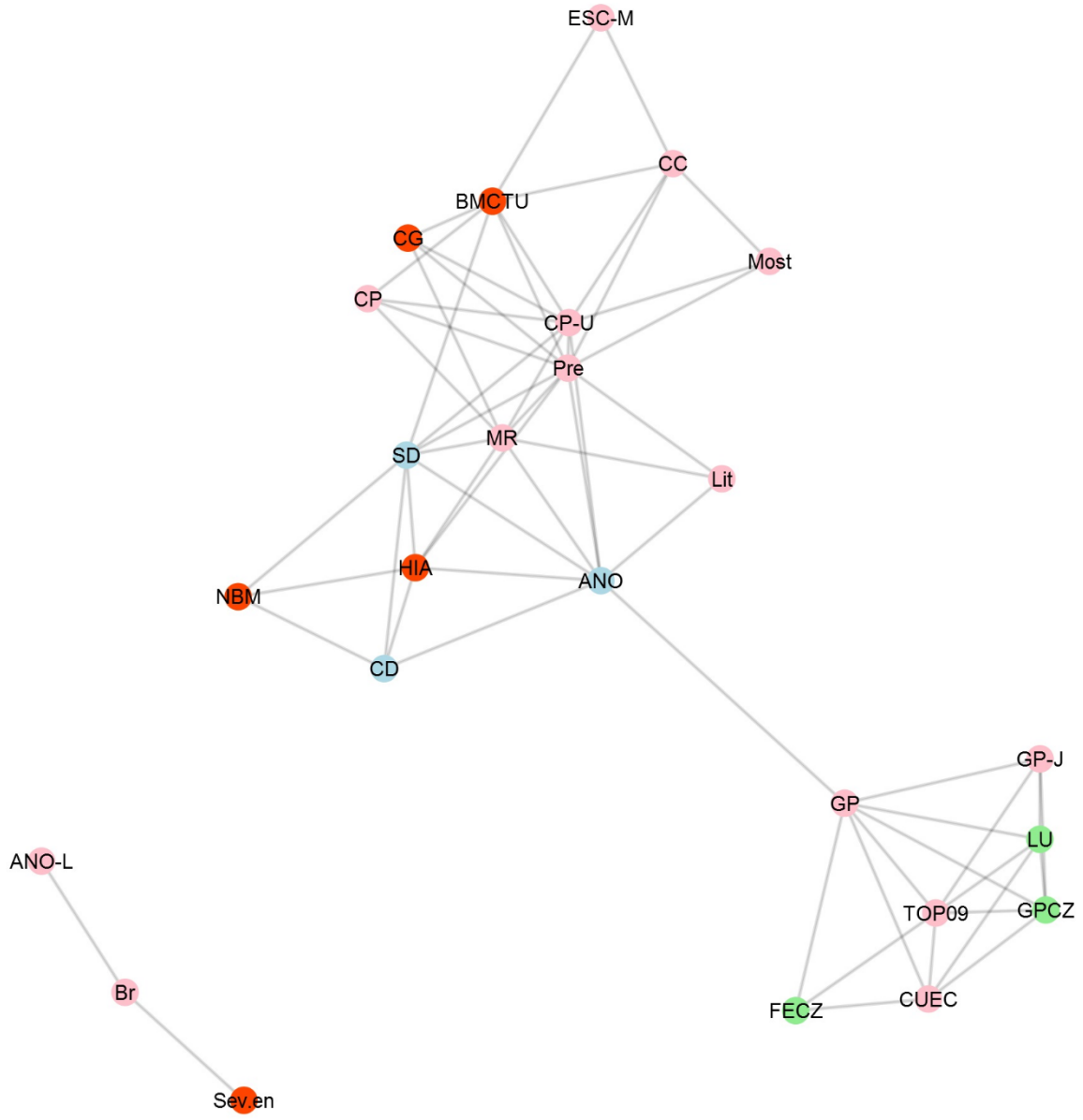

Figure 4. Normalized actor congruence network: Third stage (w > 0.5). Notes: Incumbents are coded as red, governing parties as blue, ENGOs as green, and a residual group as pink. Isolates are not displayed.

heat supplies. Further, it is emphasized that the planned expansion will not lead to removal of settlements which implies preserving the limits at the ČSA mine owned by Sev.en.

The environmental coalition (N = 6) consists of two ENGOs (Greenpeace [GPCZ] and Limits Are Us [LU]), the Green Party at both the national and local levels (GP-J), the liberal party TOP09, and Charles University Environment Centre (CUEC). The coalition re-affirms the negative environmental and health impacts of mining expansion and newly emphasizes the issue of royalty rate increases to account for the coal mining-related externalities.

The blocked actor Jaccard's similarity matrix (see Table 4) shows a similar picture as in the first stage. Importantly, the discourse alignment between the incumbents and governing parties (governing parties) was renewed (block 1–2). Likewise, the ENGOs and residual group block exhibits a statistically significantly higher similarity from the overall average (J = 0.108). In contrast to the previous stages, the similarity between ENGOs and governing parties is statistically significantly lower. The same applies to all remaining between-group blocks, which suggests increased segmentation of the discourse. The within-group similarities are above the overall average for the governing parties and ENGOs. This shows that the ENGOs' reconsolidation coupled with the newly introduced socioeconomic issue of royalty rates was insufficient to influence the debate and was rather a response to the expected outcome of a partial rescission. The incumbent group, consistently supported by the Social Democrats, therefore succeeded in aligning

Table 4. Block model: Reduced Jaccard's similarity matrix (September–October 2015).

	1. Incumbents	2. Governing parties	3. ENGOs	4. Residual group
1. Incumbents	0.126			
2. Governing parties	**0.155**	**0.304**		
3. ENGOs	**0.000**	**0.072**	**0.250**	
4. Residual group	**0.069**	**0.069**	**0.130**	0.096

Notes: The cells represent Jaccard's similarity values for the corresponding blocks. The cell values statistically significant at $p < 0.05$ level are in bold.

the remaining two governing parties to their side, although ANO 2011 did not explicitly agree with the limits' rescission, and consistently promoted a socioeconomically based narrative.

4.4. Incumbents' Discursive Strategies

When linking the distribution of concepts to the four discursive strategies (Johnstone et al., 2017), securitization is the most present (see Figure 5). This strategy is based mostly on socioeconomic arguments (27% of the incumbents' total). More specifically, incumbents emphasize job security (14%) and general socioeconomic decline (12%) which is not surprising since the concerned region is the poorest in the Czech Republic. However, framing coal as a strategic commodity that prevents import dependency and as a reliable source of electricity that, in contrast to renewables, stabilizes the supply grid is only marginally present (1%). Securitization appeals related to the foreseen phase-out of nuclear power plant Dukovany and the updated State Energy Policy which envisages a declining role for coal in energy mix are absent.

Masking was marginally present through the argument that the removal of settlements is the most serious obstacle to potential mining expansion (2%). Not surprisingly, this concept is used by the company North Bohemian Mines, which operates the Bílina mine, where the limits' rescission does not imply settlement removal, contrary to the ČSA mine owned by Sev.en. Nevertheless, masking can also be seen as the absence of concepts referring to environmental, health, and other negative impacts of coal mining and use. Of the 73 total statements referring to these concepts, incumbents made only 3 of them (2% of the incumbents' total). There are also very

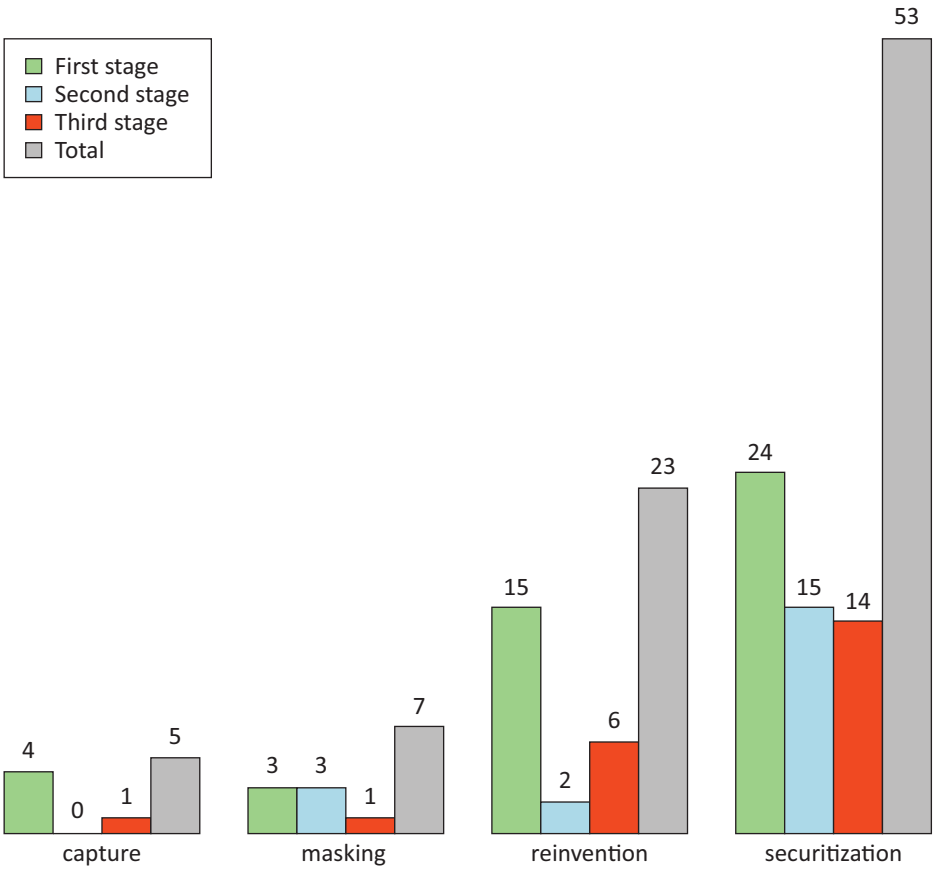

Figure 5. Frequencies of incumbents' discursive strategies.

few direct disagreements with these concepts (3 out of 197 incumbent statements), which indicates that incumbents decided not to engage in direct confrontation with the environmental coalition.

Reinvention is present mainly through portrayals of coal as a vital source of heating supplies (7%). Although such use of coal is not innovative, by shifting the emphasis from electricity generation to heating supplies, incumbents have 're-invented' the critical importance of coal for the future energy mix. Importantly, this argument was later declared by the government as a key reason for rescinding the limits at the Bílina mine. As another example, the method of combined surface and underground mining being described as less harmful in terms of local impacts is marginally present (1%).

Capture can be explicitly linked only with the promotion of the state's direct involvement in coal mining as articulated by private company Sev.en (3%). Sev.en proposes a joint venture project with the state as a shareholder and argues that such arrangement would ensure efficient as well as fair cost–benefit distribution of the mining expansion. It is important to add that the company North Bohemian Mines is owned by another incumbent actor, ČEZ Group, whose majority shareholder is the Czech government. Thus, Sev.en attempted to follow a model which would decrease its control over the reserves but ensure continuation of mining at the ČSA mine.

5. Discussion and Conclusions

This article analyzed the evolution of the Czech media discourse on coal in 2015—the year the government decided to partially rescind the coal mining limits, thereby substantially postponing the coal phase-out. The two research objectives were followed. First, we examined discourse alignment between incumbent actors and governing parties (Geels, 2014; Smink, 2015) within the context of an adversarial subsystem (Ocelík et al., 2019; Weible, 2008). As expected in energy-related subsystems (Ingold et al., 2017), we identified two antagonistic coalitions, a dominant industry coalition led by incumbents and a minor environmental coalition led by ENGOs. The discourse alignment was reinforced even before the decision on the mining limits, which was favorable to most of the incumbents, was made. Second, we explored the discursive strategies used by incumbents (Johnstone et al., 2017), mostly relying on securitization appeals emphasizing job security and economic decline arguments.

The discourse alignment between incumbents and governing parties varied across the three stages. In the first stage, the socioeconomic narrative formulated by incumbents resonated well with the Social Democrats' policies and mobilized support of the allied, mostly regional, actors. This is consistent with Smink's (2015) argument that incumbents tend to refer to general issues which are only indirectly linked to their interests. In the second stage, following the amendment of the State Energy Policy, the alignment between incumbents and governing parties vanished. We offer two explanations here. First, it could be due to incumbents' move toward instrumental strategies (Geels, 2014) based mostly on lobbying and advocacy activities (see Ocelík et al., 2019). The efforts of the most active incumbent, Sev.en, to establish a joint venture with state participation, as well as its proposal to buy out properties that would be removed if more extensive variants of the limits' rescission were adopted, provide supportive evidence (cf. Vlček et al., 2019). Second, since the government declared it would decide based on the results of impact studies, the discourse as such shrunk and policy actors awaited the studies' publication in order to consider their results before formulating their subsequent strategies. In the third stage, two out of the three governing parties joined the industry coalition, thus securing its dominant position before the government's decision. This was facilitated by the inferior position of the environmental coalition, which was unable to expand to include new members that would challenge the status quo (Shanahan et al., 2011).

As for discursive strategies, our findings show that incumbents skillfully employed a mix of strategies, consisting mostly of securitization complemented by reinvention and masking (Johnstone et al., 2017). Incumbents highlighted the risks of increased unemployment and regional economic decline (securitization) while emphasizing the vital role of coal for heating supplies (reinvention) and concealing the negative externalities of coal mining (masking). Rather surprisingly, securitization based on the expected increase of import dependency due to coal phase-out was only marginally present (cf. Lehotský et al., 2019). This is a striking difference from Polish discourse where coal is seen as a material guarantee of energy sovereignty and security of energy supplies (Osička et al., 2020). Although capture, a blurring of public and private interests, was also only marginally represented, we argue that the long-term partnership between the Social Democrats, which controlled the Ministry of Industry and Trade, and incumbents, especially the ČEZ Group, supports the interpretation that such arrangement was already in place (see Osička & Černoch, 2017). Moreover, Lehotský et al. (2019) documented that over the long term, the Czech media discourse has emphasized the economic problems of mining companies rather than environmental or other negative impacts as a public issue.

As a result, incumbents successfully established "a winner's tale" (Shanahan et al., 2011), i.e., a coherent and persuasive narrative which, as Smink (2015) argued, provides much wanted order in complex situations. Such narrative diffuses benefits, in this case framed as regional development, and concentrates costs, minor impacts on local communities, to portray the status quo, i.e., continuation of mining, as positive (Baumgartner & Jones, 1993; Shanahan et al., 2011). As Shanahan et al. (2011) argue, coalitions with coherent narratives more likely influence policy outcomes. Likewise, Leifeld and

Haunss (2012) posit that successful coalitions are stable over time in terms of both their core actors and frames integrated into a consistent story line.

We argue there are three major policy implications. First, regime challengers need to create coherent narrative(s) that do not rely only on particular issues but provide an alternative vision for the subsystem and, more generally, future regime organization that is appealing also to wider audiences. This requires coordination at the coalition level (see Schmidt, 2008), as well as efforts to involve key actors, such as policy-makers and regional authorities, in constructing the regime-challenging narratives. Narratives promoted by incumbents should be explicitly and persistently confronted, in order to increase overall polarization of the debate (Černoch, Lehotský, Ocelík, Osička, & Vencourová, 2019), potentially contributing to the disintegration or weakening of the dominant incumbent-led coalition (see Leifeld, 2013). Second, a regime-challenging coalition needs to be inclusive. It should consist not only of usual suspects such as environmental movement actors led by professional ENGOs and countervailing industries, but also research organizations, providing scientific expertise, as well as regional and local actors from transition-affected areas, providing legitimacy. Thus, a participatory mode of activism (Petrova & Tarrow, 2007) should be utilized due to its high mobilization and advocacy capacities, which are critical for coalition expansion. Third, better understanding of how incumbents engage in discursive struggles is useful not only to challengers but also to policy-makers, which are expected to occupy a brokerage position and facilitate between-coalition policy learning (Leifeld, 2013). This further implies that policy-makers should systematically obtain and consider inputs and policy proposals also from minor coalitions (see Smink, 2015). The establishment of policy venues (Fischer & Leifeld, 2015) to facilitate this process is an advisable step.

This research of course has certain limitations to be addressed. First, it is a single case study focused primarily on novel empirical evidence, which implies limited generalizability of the results. Moreover, the study omits incumbents' non-discursive strategies. Second, it uses descriptive and exploratory methods for coalition detection and discursive strategies analysis, which limits the evaluation of uncertainty.

Considering the above, there appear to be two promising directions for future research. First, application of inferential methods to coalition detection would be a logical next step. Second, expanding the research scope to non-discursive incumbent strategies that could also be integrated into a comparative framework seems especially promising.

To conclude, this study examined the role of incumbent actors in the Czech media discourse on coal within the context of an adversarial subsystem. The results showed that incumbents successfully prevented policy change to rapid coal phase-out pursued by the environmental coalition through a discourse alignment with governing parties and efficient use of discursive strategies. The industry coalition's dominant position was further strengthened by two other factors. First, the combination of the incumbents' strategy to avoid direct confrontation with opponents and the inferior position of the environmental coalition, which did not challenge incumbents' socioeconomic narrative, contributed to a lower level of discourse polarization. Second, the adversarial nature of the subsystem (Ocelík et al., 2019) limited the potential for between-coalition learning, which could have eroded the industry coalition's dominant position by shifting some of its members to the environmental coalition as early adopters (see Leifeld, 2013). As a result, the overall coalition structure remained relatively stable (Leifeld & Haunss, 2012), and the policy outcome, i.e., limited mining limits rescission, ensured the continuation of the status quo within the subsystem.

Acknowledgments

The article reanalyzes the data from the MA thesis written by the first author (Černý, 2019). The authors would like to thank the Academic Editor, Philip Leifeld, and the two anonymous reviewers for their valuable comments, which helped substantially to improve the article, as well as Colin Kimbrell, who provided language editing services. The authors also thank Marína Urbániková and Lukáš Lehotský for useful suggestions. The article was written as part of the project 'Perspectives of European Integration in a Changing International Environment II' (MUNI/A/1044/2019).

Conflict of Interests

The authors declare no conflict of interest.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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COGITATIO

Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 286–297
DOI: 10.17645/pag.v8i2.2580

Article

Business Power in Noisy Politics: An Exploration Based on Discourse Network Analysis and Survey Data

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Submitted: 28 October 2019 | Accepted: 29 February 2020 | Published: 2 June 2020

Abstract
This study links voter-centred and interest group perspectives to assess the role structurally powerful businesses can play in contested political issues. Revisiting the literature on business influence in politics, incumbent businesses are theorised to strategically use their structural power to influence voters' preferences. The conceptual framework is illustrated with a case study of a direct democratic vote related to Swiss energy policy. To empirically trace the role incumbent businesses played in the run-up to the vote, the study employs a two-step approach. First, it uses discourse network analysis (DNA) to examine arguments and actor coalitions in the public debate preceding the vote. Second, the DNA results inform a statistical analysis of survey data on voting behaviour. The findings suggest that incumbent businesses can use their structural power strategically to shape voting behaviour. The study stimulates the discussion about political power relationships in societies and enriches the nascent debate about phasing out unsustainable energy infrastructure. Importantly, it opens up ways to combine DNA with other methods, an avenue that shows promise for use and further refinement in future applications.

Keywords
business; discourse network analysis; direct democracy; energy; energy policy; nuclear power; phase-out; preference formation; structural power; Switzerland

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

In 2016, Swiss voters had the opportunity to stop the domestic use of nuclear power. Fuelled by the 2011 Fukushima nuclear disaster in Japan, the Green Party of Switzerland had launched a popular initiative to phase out this technology for electricity generation. The initiative provided for a gradual process of power plant closures, with the last plant to be retired by 2029. Home to the oldest nuclear power fleet in the world, the Swiss population had formerly rejected a number of similar popular initiatives at the ballot between 1984 and 2003. Given the sustained and vocal opposition to nuclear power among parts of the population, observers viewed the Fukushima disaster as the proverbial last drop needed to make the bucket overflow, in the sense of initiating a fundamental rethink of Swiss energy policy (also in view of the substantial changes in energy policy that Switzerland's neighbouring countries Germany, Italy, and even France enacted after Fukushima). However, while polling found that a robust majority supported the popular initiative until six to eight weeks before the vote, the proposition was finally rejected by 54.2 percent of voters. How can this outcome be explained?

The politics of energy technology phase-outs have recently become a topic of interest for academic researchers (Leipprand & Flachsland, 2018; Normann, 2019; Rosenbloom, 2018; Schreurs, 2013), as demands for phasing out energy assets that produce public 'bads' (such as nuclear waste or carbon dioxide emissions) are currently being articulated in many countries. Retiring such legacy assets might be desirable from a societal point of view, but the process comes along with concentrated losses that are mainly incurred by a relatively

small number of actors (e.g., electric utilities and mining companies) who have benefited from previous policy choices. Therefore, these actors have a strong incentive to politically organise themselves to avert change. To organise their opposition, the expected losers of energy system changes often join forces (Kim, Urpelainen, & Yang, 2016). In addition, they tend to rely on trade associations, peak organisations, and other political actors to influence public discourses and decisions (Barley, 2010). With respect to nuclear power, it is known that business interest groups are making considerable effort to influence public preferences and discourses (Gilbert, Sovacool, Johnstone, & Stirling, 2017; Shrader-Frechette, 2011). However, little is known about the actual effects these activities have on people's perceptions and preferences. The controversy around the popular initiative to phase out nuclear power in Switzerland provides an opportunity for the systematic study of the arguments employed by both proponents and opponents of a nuclear phase-out in public discourse, and for exploring how the former may impact voters' decisions concerning whether to support such a proposal at the ballot box.

Conceptually, the study is anchored in broader debates about the role of business influence in politics. As Lindblom (1977) famously argued, incumbent businesses, based on their control over important economic resources, enjoy a 'privileged position' in the political system. The state's dependence on private sector profitability often allows businesses to influence political decisions. This structural power typically comes with resource advantages and privileged access to decision-makers, amplifying business influence in policymaking (Newell & Paterson, 1998). While this perspective is helpful for understanding how businesses and business interest groups can shape political outcomes in arenas shielded from voter influence, it has less to say about business influence in noisy politics. Noisy politics refers to situations of high salience in which the preferences of attentive voters are important signposts for policymakers. Importantly, voters' initial preferences in these situations might run counter to business interests. Are businesses able to sway voters' preferences in situations of noisy politics? If so, how?

In asking these questions, the study takes up Culpepper's (2016, p. 460) call for "returning the voting public to [the] inquiry into political conflict between interest groups." While the behavioural political science literature has produced a vast body of work on the sources and effects of citizen preferences and voting behaviour, organised interests and the concept of business power are underrepresented in these accounts (Hacker & Pierson, 2010, p. 167). Further, although much research assumes that vested interests are an important driver of voter preferences, few studies have underpinned this link empirically (Dür, 2018). As a contribution to bridging this gap, this investigation follows Emmenegger and Marx's (2019) suggestion of integrating behaviouralist and interest group perspectives and studying politics as an 'organised spectacle.' It thereby specifically focuses on the role of political discourse in which political actors exchange (and contest) their arguments, and explores the extent to which citizens' approval of prominent arguments raised by political actors relates to their voting behaviour.

2. Business Power and Preference Formation

2.1. Business Power and Noisy Politics

Lindblom (1977) argued that, compared to other political elites, business enjoys a 'privileged position' in politics. Businesses command financial and human resources and crucial knowledge that they can employ to convert their interests into political influence. As more recent research has shown, businesses have a particularly strong influence on public policies in situations of 'quiet politics.' Quiet politics refers to issues with little public scrutiny and low sustained interest from the voting public (Culpepper, 2016, p. 461). If the public does not function as a veto player, businesses can work through covert channels of influence and do not need to take partisan political incentives into account (Culpepper, 2011).

But what happens if policy issues become salient? Consider climate change, or the gender pay gap: While voters in many places have been largely indifferent to these issues over sustained periods of time, allowing businesses to dictate public policies (or the absence thereof), these issues have recently been elevated on political and media agendas. In such situations of high salience business interests are less likely to become directly converted into policy as policymakers have to attend to voters' preferences as well. This makes voters' preferences an obvious—albeit not the only—target of the political activities of businesses.

To understand the ways in which businesses may try to sway voters' preferences, the distinction between instrumental and structural power is helpful (Culpepper & Reinke, 2014; Lindblom, 1977). Instrumental power is based on a number of strategies that businesses employ to influence the public, such as public relations campaigns or donations. Influence is less strongly assumed to be a result of persuasion, but rather to depend on the amount of resources that are deployed (Emmenegger & Marx, 2019, p. 107). While research on the influence of financial resources in electoral politics abounds, evidence concerning the conjecture that 'money buys politics' is inconsistent at best (Walker & Rea, 2014, p. 286).

However, some businesses also wield a structural form of power, a fact which has received far less attention in the electoral literature. A firm's structural power is the result solely of its position in the economy (Culpepper, 2016, p. 459). Structural power is assumed to constrain policymakers' room for manoeuvre automatically, because policymakers that aim at re-election need to be attentive to the impacts their policies have on short-term economic prosperity (Przeworski & Wallerstein, 1988). Firms, according to this perspec-

tive, influence political decisions "whether they want to or not" because their "sheer existence…leaves them no alternative" (Bachrach, 1967, p. 80). Recently, though, the deterministic drive of the structural power argument has been criticised (Bell & Hindmoor, 2014; Culpepper, 2016). Especially in situations of noisy politics, structural power requires agency to become converted into policy. The reason for this is that many voters (unlike politicians) are likely to be uninformed about business preferences. In policy debates, businesses can therefore be expected to actively argue for their preferred courses of action. However, rather than using arguments that reflect their narrow self-interest, businesses may strategically signal what adverse effects may be expected if their preferences are not converted into policy. Such signals may be most effective when they imply tangible threats that are directly relevant to voters. Some of these arguments may be expected to resonate especially well with the population. As an example, Emmenegger and Marx (2019) show how the arguments of businesses against an inheritance tax proposal in Switzerland focused on the potentially negative effects that such a tax could have on competitiveness and jobs. Leaving aside whether such concerns were justified, what matters in such situations are voters' beliefs, and these are socially constructed (Emmenegger & Marx, 2019, p. 107). This view of structural power assigns a strong role for agency by recognizing that the former can be deliberately used by businesses as a strategic resource (Culpepper & Reinke, 2014). In this sense, structural power in noisy politics becomes effective only if it is aligned with discursive strategies (Levy & Egan, 2003).

2.2. Amplification of Power through Business–Party Alliances

Experimental research shows that the ability of organised interests to affect voters' preferences can be very limited (Nicholson, 2011). The reason is that voters predominantly attend to arguments they perceive as credible, and the perceived credibility of an argument, in turn, depends on the communicator's trustworthiness (Page, Shapiro, & Dempsey, 1987; Rinscheid, Pianta, & Weber, in press)—an asset that is not necessarily one of the strengths of 'big business.' Hence, to successfully affect voters' preferences in noisy politics, businesses need strong and trustworthy allies to communicate their arguments. They typically find these allies in government and political parties and may take advantage of the fact that voters often use information about parties' positions as a simplifying heuristic when forming preferences about specific political issues (Kriesi, 2005). In noisy politics, businesses' structural power can thus be expected to be amplified through political parties.

2.3. Preference Formation

In contrast to mainstream assumptions, most individuals do not have clear-cut preferences with respect to most issues (Weber & Johnson, 2009). Instead, they "carry around in their heads a mix of more or less consistent 'considerations'" (Zaller & Feldman, 1992, p. 585). While some of these considerations can be congruent, others may be mutually conflicting. For instance, in the context of environmental protection, voters might consider personal freedom, job security in polluting industries, and the state of the natural environment as relevant considerations. When facing a choice situation (e.g., a direct democratic vote), voters have to assign weights to these considerations to come to a decision. This is a complex task, highlighting that citizens' preferences are not predetermined by exogenous interests (Emmenegger & Marx, 2019). Importantly, political actors, including business interest groups that have an interest in shaping voters' preferences, can strategically (re)frame an issue or emphasise specific arguments so as to raise the accessibility and perceived appropriateness of specific considerations (Chong & Druckman, 2007). Preference construction in noisy politics is hence an 'organised spectacle' in which citizens respond to the frames and cues they receive from political elites (Emmenegger & Marx, 2019).

To study the arguments that structurally powerful businesses employ to influence citizens' preferences regarding public policies, a case study involving a direct democratic vote in Switzerland is employed. Direct democratic votes, which are typically preceded by contested political campaigns, can provide a highly instructive setting for the study of noisy politics.

3. The Case of Swiss Nuclear Power Politics

The use of nuclear power has been a salient topic in Switzerland since the 1970s. While left-wing and green parties, environmental organisations and 'green' businesses (e.g., firms that invest in renewable energies) favour a nuclear-free energy system, incumbent businesses from the energy sector and beyond, industry associations, and centre-right parties have been supportive of nuclear power (Fischer, 2015). This constellation mirrors the stable line-up of two opposing political coalitions that spans environmental and energy policymaking in Switzerland as a whole (Kriesi & Jegen, 2000; Markard, Suter, & Ingold, 2016). Big electric utilities are structurally powerful not only because they provide jobs, invest, and pay taxes, but also due to their role as providers of critical infrastructure and electricity as a basic public service. It is worth pointing out that not all businesses are structurally powerful, though. The structural power of incumbent businesses like utilities that operate nuclear power plants differs significantly from that of newer firms that rely on more recently developed technological and business model innovations. In keeping with the conventions of the literature, I refer to business's structural power when in fact it would be more precise to talk about the structural power of incumbent businesses.

Triggered by the Fukushima crisis, the Green Party launched a popular initiative in 2011 which proposed

to restrict the lifetime of nuclear reactors to 45 years. The proposal implied retirement of three of the five existing reactors in 2017, and the remaining ones in 2024 and 2029. In line with the polarised political constellation, and as is typically the case with popular initiatives, political parties, interest groups, businesses, and organisations representing civil society engaged in fervent competition to influence public views about the ballot proposition. The proposal was finally rejected by 54.2 percent of voters that participated in the November 2016 ballot. The rejection of a ballot proposition is not surprising *per se*, but the latter outcome is puzzling because studies that assessed public opinion about nuclear power after Fukushima consistently showed that a majority of Swiss citizens were opposed to the technology (Kristiansen, Bonfadelli, & Kovic, 2016; Siegrist, Sütterlin, & Keller, 2014; Visschers & Siegrist, 2013; WIN-Gallup International, 2011) and were in favour of phasing out nuclear power, precisely according to the plan proposed by the Green Party (Swiss Electoral Studies 2015, 2017, p. 119). Even six to eight weeks before the vote, the ballot proposition was supported by almost 60 percent of the electorate (Gfs.bern, 2016). While observers of Swiss politics may rightly identify this development as a recurring pattern with popular initiatives, this pattern-matching provides no explanation for the outcome. I contend that any explanation of the collective preference shift needs to take the role of business power into account.

3.1. Empirical Expectations

Based on the conceptual priors discussed in Section 2, three expectations can be derived that guide the empirical analysis. First, during the referendum campaign incumbent businesses publicly express concern about the potentially negative effects of the proposed nuclear phase-out. Instead of pointing to their own foregone income, the concerns raised by structurally powerful businesses should entail threats of direct relevance to voters. Second, these businesses line up with political parties to overcome the problem of limited credibility and amplify their arguments in the news media, which represent the main arena for information transmission in direct democratic campaigns. Third, as a manifestation of business's structural power in the form of voting behaviour, the most salient arguments put forward by incumbent businesses and parties are predictors of voters' choices. By empirically investigating each of the three steps, the empirical analysis helps with understanding the failure of the Swiss nuclear phase-out proposal and stimulates discussion about business's ability to shape public perceptions.

4. Empirical Analysis

4.1. Levels of Analysis

Conceptually integrating interest group arguments with a behaviouralist perspective on citizen preferences implies that the empirical investigation needs to be attentive to different levels of analysis. The first and second steps focus on the political debate between supporters and opponents of the phase-out policy as it unfolded in the media arena. To assess the extent to which various actors tried to shape the public debate before the vote, I use discourse network analysis (DNA). The investigation is complemented with further evidence from primary and secondary sources. The third step relates to another level of analysis: For gauging the role that specific arguments played in voters' preference formation, data from a post-vote survey are analysed by means of regression analysis.

4.2. Arguments and Actor Constellation

4.2.1. Method and Data

DNA helps to systematically assess the salience of arguments in a discourse and actor constellations, such as incumbents' connections to political parties, over time (Leifeld, 2017). The first step in DNA is the qualitative or semiautomatic coding of statements in a text corpus. Based on the resulting dataset, different types of networks that may help with uncovering the structure of the underlying discourse can be generated. For example, an affiliation network is a bipartite graph that captures how actors refer to arguments either in an affirmative or in a negative way. An affiliation network can be transformed into an actor congruence network, i.e., an adjacency graph, in which actors are connected to other actors if they employ the same argument(s) in the text corpus under analysis. An actor congruence network can be useful for identifying coalitions of actors that share common understandings (Leifeld, 2016). Figure 1 illustrates the basic model of a discourse network and contains further explanations in the captions.

In Switzerland, more than 90 percent of the population regularly read printed newspapers (WEMF, 2019), and Swiss interest groups consider newspapers to be more important for their communication activities than other channels (Jentges, Brändli, Donges, & Jarren, 2013). Newspaper articles are therefore a suitable data source for an empirical examination of the theoretical expectations developed in Section 3.1. The dataset used in this study relies on content analysis of all newspaper articles (excluding paid content and letters to the editor) that dealt substantially with the ballot proposition and were published between September 5 and November 20, 2016, in 22 Swiss newspapers (Table 2 in the Supplementary File includes the list of newspapers). This time frame corresponds to the core campaigning period before the vote took place. The dataset comprises newspapers from the two major Swiss language regions. It thereby covers all relevant quality newspapers, as well as the newspapers with the highest circulation in Switzerland (including free tabloids). This comprehensive newspaper sample includes a wide array of

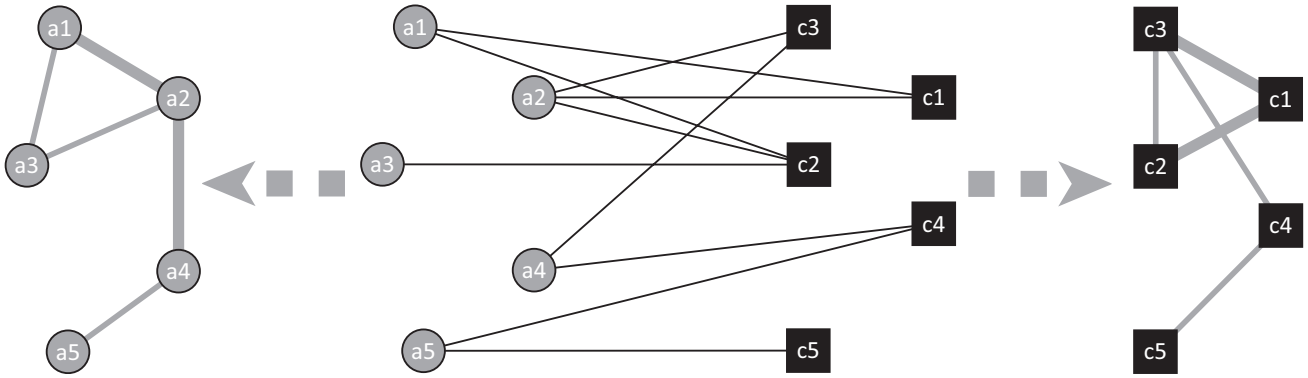

Figure 1. Basic model of a discourse network. Source: Author's own depiction based on Leifeld (2016). Notes: Circles symbolise actors and boxes symbolise arguments. The network in the middle represents an affiliation network. Here, the presence of a line indicates that a certain actor (for example, a2) mentions the linked argument (e.g., c3). The number of times an argument is mentioned in the discourse is captured by the argument's *indegree centrality* (e.g., indegree = 2 for c3). Likewise, the number of arguments an actor makes is captured by the actor's *outdegree centrality* (e.g., outdegree = 1 for a3). The left network illustrates the corresponding actor congruence network. In this co-occurrence network, two actors are connected if they share at least one argument in the affiliation network (a1 and a2 both mention c1 and c2). The more densely connected two actors are (depicted by line width), the more arguments they have in common. The network on the right-hand side represents the corresponding concept congruence network, where two arguments are connected if they are mentioned by the same actor (c4 and c5 are both mentioned by a5).

media with different ideological leanings, which is why the ideological bias of any individual newspapers may be only a minor issue. The dataset was compiled by the Research Institute for the Public Sphere and Society at the University of Zurich (see Udris, 2016), which since 2013 has compiled systematic datasets and analyses of newspaper reporting before all federal referenda.

In total, the text corpus includes 395 newspaper articles. The unit of analysis is the statement. Based on a coding scheme (see Table 1 in the Supplementary File), each statement made by individual or collective actors was manually encoded according to six variables:

- The date of the statement;
- The newspaper in which the statement appeared;
- The name of the actor who made the statement;
- The actor's organisational affiliation;
- The argument revealed in the statement; and
- Whether the actor approved or rejected the argument.

4.2.2. Results

Overall, 20 different arguments were voiced by 269 actors. The distribution of observations is relatively balanced, with 689 statements supportive of the initiative and 751 statements rejecting the ballot proposition. Table 3 in the Supplementary File details the six most frequently used arguments.

As can be seen in Figure 2, both supporters and opponents of the proposition used a broad range of arguments. The most important argument voiced by the opponents of the nuclear phase-out was the claim that the phase-out plan, which provided for a gradual phase-out by 2029, was too 'hasty' and would lead to 'chaos' ('timing too hasty'; indegree: 104). Next, the phase-out would necessitate large-scale electricity imports, with most of the electricity coming from Germany, a country in which 40 percent of the electricity mix was generated by coal-fired power plants at the time ('coal power import'; indegree: 97). This, according to opponents of the phase-out, would increase the carbon footprint of the Swiss electricity sector. Third, the pro-nuclear coalition argued that phasing out nuclear power would be 'too costly,' especially as it would lead to an increase in consumer prices ('cost of phase-out'; indegree: 78). Fourth, claims that retiring the nuclear reactors would endanger electricity supply, a key concern for many voters, also played an important role in the campaign ('endangered security of supply'; indegree: 63). Arguments about cost and security of supply can especially be interpreted as a direct manifestation of incumbents' structural power. The four most frequently mentioned arguments against the phase-out were also part of a large-scale print and online advertising campaign. Figure 3 shows an example of a poster that combines these four arguments in an emotionally appealing way by conveying the threat of supposedly imminent blackouts. The poster highlights that the findings obtained via DNA with respect to the prominence of specific arguments are not confined to the sphere of newspaper reporting. Instead, they mirror the broader communication patterns employed by the pro-nuclear coalition.

The pro-phase-out coalition focused in particular on the risks of nuclear power (Figure 2), which were mentioned frequently in the discourse ('nuclear risk'; indegree: 173). Moreover, these actors attempted to counter the argument that a nuclear phase-out would impair

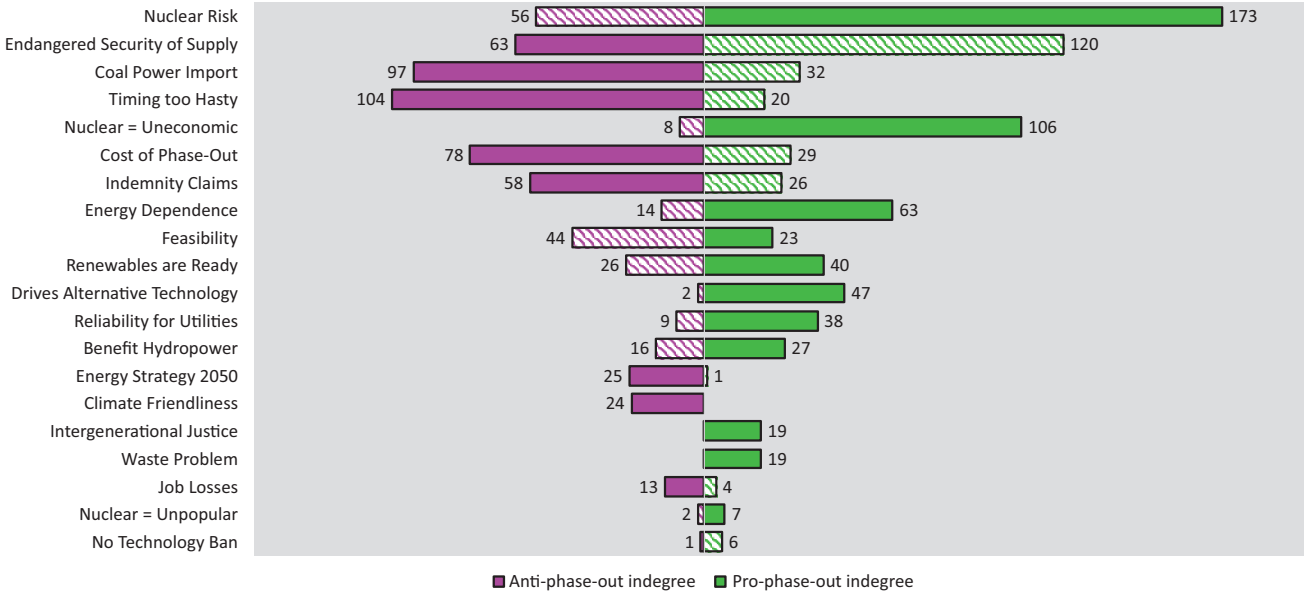

Figure 2. Bar graph showing arguments used by supporters (green bars) and opponents (purple) of the nuclear phase-out. Note: The size of the bars is proportional to the indegree centrality of the arguments. Filled bars indicate affirmative use of an argument, and patterned bars indicate negative use. For example, the argument that nuclear power is risky ('nuclear risk') was used in the affirmative sense by phase-out supporters and in the negative sense by opponents, while the argument that the phase-out would endanger security of electricity supply ('endangered security of supply') was used in the affirmative sense by phase-out opponents and in the negative sense by supporters. Based on 1,440 statements conveyed by 269 actors.

security of supply ('endangered security of supply'; indegree: 120) and portrayed nuclear power as uneconomic ('nuclear = uneconomic'; indegree: 106). Other arguments appeared considerably less frequently.

Figure 3. Anti-ballot-proposition poster. Translation: NO to rash actions in nuclear phase-out, NO to chaotic immediate shutdown, NO to reduced security of supply, NO to foreign coal electricity, NO to Billions in costs. No to the extreme nuclear phase-out initiative. Source: Ausstiegsinitiative nein (2016).

Turning to the second expectation, Figure 4 illustrates the 15 collective actors who were most active in the discourse prior to the popular vote. Among the opponents of a nuclear phase-out, the party of the Federal Councillor for Energy most actively campaigned against the ballot proposition (Christian Democratic People's Party; outdegree: 138), ahead of the conservative liberal FDP (outdegree: 77). The third most active opponent was the Axpo Group (outdegree: 50), a company that partly or fully owns three of the four Swiss nuclear power plants. Other actors that actively campaigned against the phase-out included energy utilities Alpiq and BKW Energie AG, the trade associations Economiesuisse and the Swiss Trade Association SGV, the right-wing Swiss People's Party, and the Swiss transmission network operator, Swissgrid. On the side of phase-out advocates, the Green Party (outdegree: 212) stands out as the most active actor, way ahead of other actors such as the Social Democratic Party (outdegree: 68) and the Green Liberal Party (outdegree: 42).

To illustrate how incumbent energy businesses lined up with political parties, Figure 5 depicts the actor configuration based on an actor congruence network. Here, two circles are linked if the actors which they represent share at least one argument. Closely connected clusters of circles represent coalitions of actors that share similar arguments. As can be inferred from the graph, there was clear bipolarization between supporters of the ballot proposition (represented by 119 actors on the left) and opponents (108 actors on the right). The application

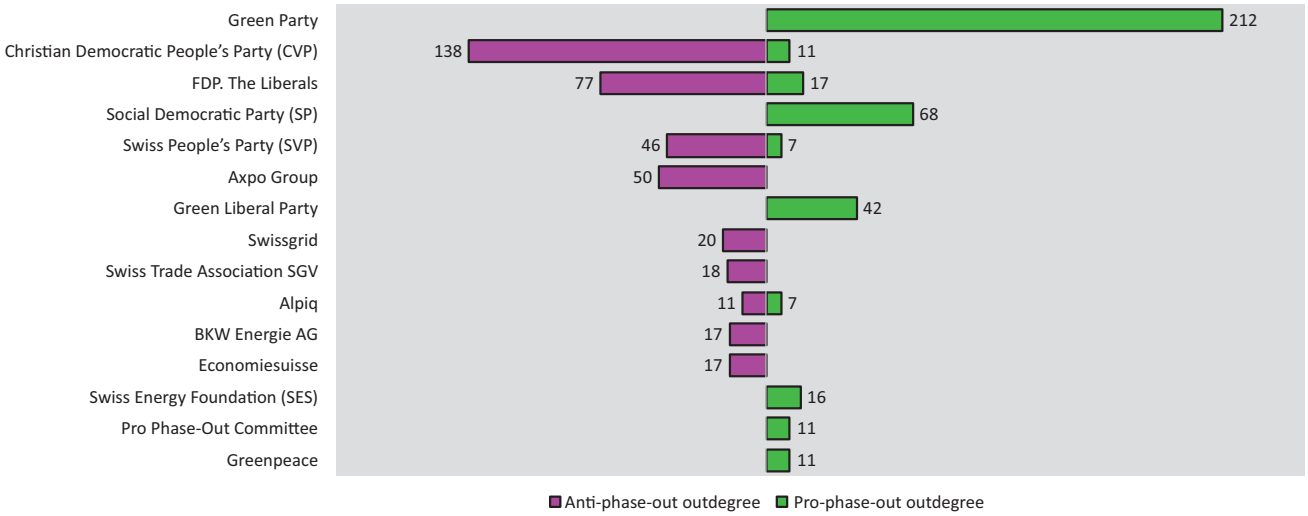

Figure 4. Bar graphs showing the 15 most active collective actors (i.e., aggregated by organisation) supporting (green bars) and rejecting (purple) the phase-out in the discourse. Note: The size of the bars is proportional to the actor's outdegree centrality. Based on 1,440 statements conveyed by 269 actors.

of the Girvan–Newman clustering algorithm, which detects coalitions by removing edges with high betweenness values, formally confirms the bipolar network structure (Girvan & Newman, 2002).

The coalition of opponents was dominated by the big utilities (Axpo Group, Alpiq, BKW Energie AG) and several interest groups representing incumbent actors (purple circles). Moreover, these actors were well connected with the centre-right parties that opposed the proposal (blue circles). While the graph is exclusively based on shared arguments in the public discourse, the illustration mirrors Gava et al.'s (2017, p. 85) finding that Swiss business groups representing key economic sectors such as energy production have extensive interest affiliations with the parties of the political right. Going beyond an analysis of the newspaper discourse, it is known that in-

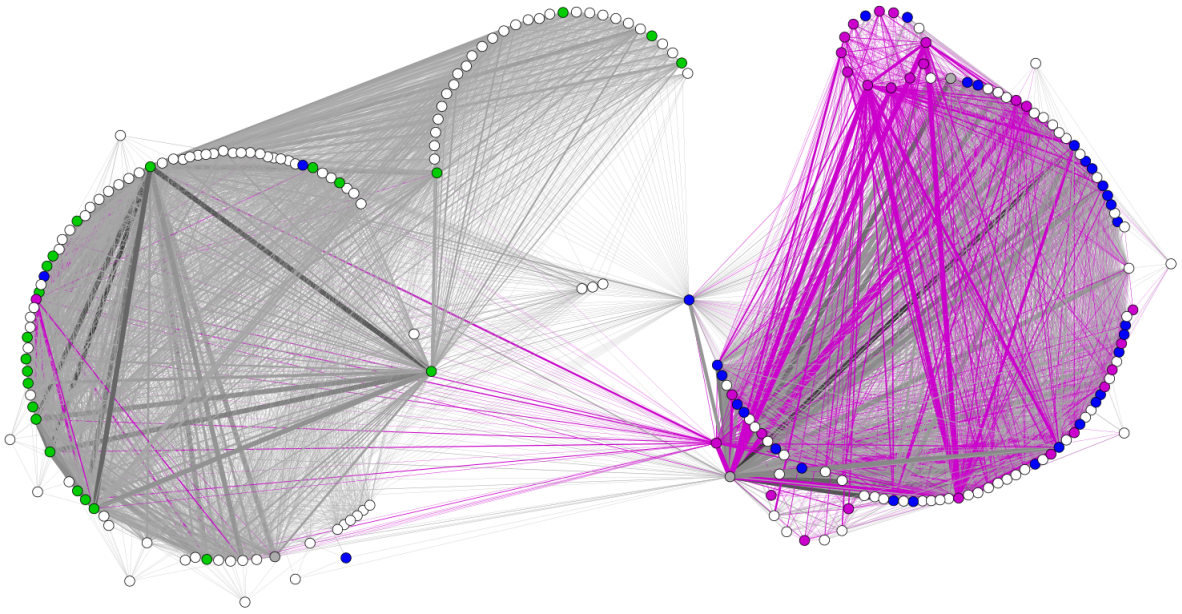

Figure 5. Actor congruence network. Note: Circles represent actors, links indicate shared arguments, and link width reflects the number of shared arguments used by connected actors. Purple circles represent actors from the nuclear utilities (Axpo Group, Alpiq, BKW Energie AG) and their interest representations, blue circles represent politicians from the parties opposing the initiative, green circles represent politicians from the parties supporting the initiative, and white circles represent other actors (e.g., municipal and cantonal authorities, scientists, etc.). All links adjacent to purple circles are also purple. Based on 1,273 statements conveyed by 227 actors. Note that these numbers are smaller than those reported in Section 4.2.2 as journalists were excluded from this network. Graph constructed with Visone 2.17 (circular layout).

cumbent businesses and centre-right parties coordinate their campaigning efforts through so-called nonpartisan committees. These committees are typically formed in the run-up to referenda and provide businesses and political parties with an opportunity to engage in mutually beneficial resource exchange (Emmenegger & Marx, 2019). By endorsing pro-nuclear arguments put forward by energy businesses, the parties lent credibility to incumbents' claims with respect to the purported downsides of a nuclear phase-out, while businesses provided campaign finance and expertise. In amplifying the arguments of business, the centre-right parties ultimately served to transmit business's structural power in the public arena.

4.3. Voting Behaviour

4.3.1. Method and Data

The third step of the analysis addresses whether the arguments put forward in the political debate are related to voting behaviour. As voting behaviour cannot be observed directly in the case of federal referenda, the analysis is based on a post-vote online survey fielded between November 27 (voting day) and December 1, 2016, using a representative sample (n = 1,014) taken from the German- and French-speaking parts of Switzerland (see Rinscheid & Wüstenhagen, 2018, and Supplementary File for more information on the survey). The focal dependent variable is support for the ballot proposition. Of the 896 respondents who confirmed their participation in the vote, ten did not remember their decision or refused to answer the question about voting behaviour. Of the remaining 886, 45.7 percent reported they had accepted the proposition, whereas 54.3 percent indicated rejection.

To assess the role of arguments, the survey included six statements about nuclear phase-out and asked participants to state their level of agreement (measured on a five-point scale from 'fully disagree' to 'fully agree'). These statements correspond to the six arguments that appeared most frequently in the public debate (see Figure 2). Table 4 in the Supplementary File includes the wording as used in the survey. Control variables include age, gender, education, partisan orientation (using a dummy variable differentiating between parties supporting and opposing the proposition), location of voters in terms of linguistic region and whether they were living within a radius of 20 kilometres from a reactor, and the number of cars in a respondent's household as a proxy for carbon footprint (Thalmann, 2004). Table 5 in the Supplementary File includes descriptive statistics.

The survey data are analysed by means of regression analysis. In order to take voting-related self-selection into account, the analysis of the determinants of voting behaviour relies on a Heckman selection strategy (see also Carattini, Baranzini, Thalmann, Varone, & Vöhringer, 2017). This procedure involves two steps, both based on regression analysis. First, the selection model models the process by which survey participants decided to participate in/abstain from the ballot; second, the outcome model models support for the ballot proposition as a function of both the independent variables and the estimates of step one (Johnston, 2013). In other words, the procedure jointly estimates the probability of participating in the vote (step one) and casting either a 'yes'- or a 'no'-vote (step two). As both outcomes are binary, I used a probit model.

4.3.2. Results

Table 1 contains the model estimates. The column labelled 'Selection Model 1' presents the estimates for participation in the popular vote (i.e., step 1). Accordingly, young age (below 35) and a higher number of cars in a household are negatively related to participation. The endorsement of arguments put forward in the public debate, on the other hand, is not systematically related to turnout rates. Moreover, as an extended model contained in the Supplementary File (Table 6, Selection Model 2) shows, there is no partisan effect, which indicates that mobilization was not skewed in favour of one of the political camps. Given that the model covers only 82 non-voters, care should be taken when interpreting these findings.

Next, I turn to explaining support for the nuclear phase-out initiative as expressed through voting behaviour (i.e., step 2). According to Outcome Model 1, all six arguments introduced earlier are significant predictors of vote choice. Adding partisan orientation does not affect this finding, and partisan orientation is not significantly related to vote choice (see Outcome Model 2 of Table 6 in the Supplementary File). An additional analysis based on a series of ordered-probit models shows that partisan orientation is, at least partly, associated with approval of arguments. Hence, while there is no direct effect of partisan orientation, its impact on voting behaviour appears to be mediated by voters' approval of specific arguments. However, while voters who lean towards centre-right parties systematically endorse incumbents' arguments against nuclear phase-out, there is not much evidence for an effect of a partisan heuristic among left-wing party supporters (see Table 7 in the Supplementary File). Further factors that are correlated with voting behaviour include age, place of residence in terms of geographical proximity to a nuclear power plant, and education. While the effect for voters younger than 35 is positive, higher education and residence within the danger zone are negatively related to support for the ballot proposition.

5. Discussion

As outlined in Section 1, the ambition of this article is to explain the outcome of the 2016 nuclear phase-out referendum in Switzerland. By systematically assessing

Table 1. Heckman-selection probit model explaining support for the ballot proposition.

	Outcome Model 1 (1 = Support for nuclear phase-out initiative)		Selection Model 1 (1 = Participation in the vote)	
Variable	Coefficient	SE	Coefficient	SE
Arguments against phase-out				
Endangered security of supply	−.477**	.093	.078	.067
Coal power import	−.313**	.101	.069	.073
Timing too hasty	−.524**	.093	.009	.068
Cost of phase-out	−.437**	.088	−.067	.069
Arguments in favour of phase-out				
Nuclear risk	.237*	.085	.031	.062
Nuclear = Uneconomic	.370*	.105	.065	.064
Controls				
Cars	−.137	.112	−.134*	.066
Young	.707**	.251	−.316*	.154
Elderly	.149	.226	.282	.158
Female	.156	.189	−.158	.125
Residence within Danger Zone	−.615*	.295	−.163	.159
French-speaking	−.358	.219	.085	.166
Higher Education	−.436*	.212	.271	.142
Intercept	3.490**	.778	.918	.521
N (censored/uncensored)	825 (82/743)			

Notes: Entries are Heckman probit coefficients and standard errors (SE). *$p < 0.05$, **$p < 0.01$.

the arguments employed in the political discourse and the actor constellation prior to the public vote, and by using this assessment to inform an analysis of voting behaviour, the study links behaviouralist and interest group perspectives. It thereby offers an explanation for the observation that voters' perceptions of nuclear power were significantly altered in the run-up to the popular vote, as documented by Rinscheid and Wüstenhagen (2018). Going beyond the latter contribution, which was exclusively based on survey evidence, this article is interested in illuminating the role of societal actors that try to shape citizens' preferences. More generally, it contributes to a broader discussion about the structural power of business and its influence on preference formation.

The Swiss popular initiative to phase out nuclear power entailed major consequences for only a small number of firms, but the latter occupy crucial positions in the economy. Although a majority of voters initially endorsed the popular initiative, the proposal was finally rejected. The analysis suggests that structurally powerful incumbents were able to raise concerns that had a direct bearing on voters' choices. These arguments, which were amplified by centre-right parties, can be interpreted as a reflection of the structural position of incumbents in the economy. The analysis underscores Emmenegger and Marx's (2019) argument that party elites, at least in Switzerland, are often part of economic elites, so that the two are almost indistinguishable. The findings also mirror Stirling's (2014) analysis of power and knowledge in nuclear energy politics. Accordingly, the ways by which "incumbent interests configure 'scientific' knowledges such as to condition wider social expectations over what is 'realistic' or 'unrealistic' as directions for technological change" are considered a pivotal lever for influencing energy policies (Stirling, 2014, p. 86). The findings can also be related to recent research in the organizational literature, in which companies' strategy of influencing voters by expressing concern about the common good has been dubbed 'corporate citizenspeak' (Nyberg & Murray, 2017).

It is important to note that the popular initiative was part of a broader process of reconfiguring Swiss energy policy. In 2011, the government launched a comprehensive policy package aimed at transforming the Swiss energy system. The Energy Strategy 2050 was adopted by parliament in September 2016 and obtained a popular majority in May 2017. According to the Energy Strategy 2050, nuclear power plants may be operated as long as they are considered 'safe' (while prohibiting the construction of new ones)—in contrast, the phase-out initiative followed a different logic by including specific retirement dates. Could the erosion of citizens' preferences for nuclear phase-out be simply due to a learning effect; i.e., the fact that voters became aware of the alternative proposal to prevent nuclear new build included in the Energy Strategy 2050 during the campaign in autumn 2016? The data suggest that this is unlikely, as the Energy Strategy 2050 did not play a prominent role in the discussions about nuclear phase-out in 2016 (see Figure 2, argument 'Energy Strategy 2050'). Why did energy incumbents

manage to induce a collective preference shift in the context of nuclear phase-out, but not in the case of the Energy Strategy? The comparison points to business polarisation as an important moderating factor of business influence: Whereas incumbents and centre-right parties were united in their fight against nuclear phase-out, only some smaller pro-nuclear interest groups, sectoral associations, and the Swiss People's Party campaigned against the Energy Strategy 2050. Meanwhile, energy incumbents like Axpo Group and Alpiq, the Association of Electricity Companies, and some of the parties that were against the phase-out initiative supported the comprehensive Energy Strategy 2050.

The study responds to calls to devote more attention to the political dynamics of energy transformations (Stokes & Breetz, 2018) and contributes to the emerging debate about the deliberate destabilization of unsustainable energy systems (Kivimaa & Kern, 2016; Rosenbloom, 2018). The study's implications are not unique to the energy sector, though. Similar mechanisms have been shown to operate in the field of the politics of taxation, where business's structural power can explain voters' opposition to higher taxes on the super-rich (Emmenegger & Marx, 2019). The analysis demonstrates that business's structural power requires agency to become manifest in noisy politics. Without transmission through discursive channels (i.e., campaigns that use trustworthy actors to make incumbents' arguments heard), structural power will remain ineffective.

Methodologically, one of the study's objectives was to demonstrate how the DNA method can be used to inform an analysis of survey data. Specifically, the connection of DNA and survey data analysis shows promise in terms of fostering understanding of how business power and arguments voiced in political debates influence citizens' preferences. Of course, the study also has some limitations. Most importantly, perhaps, the research design does not permit the direct testing of causal links. While the correlational evidence suggests that voters affiliated with centre-right parties considered business arguments to be credible and hence rejected the ballot proposition, experimental or panel data would be needed to provide conclusive evidence of the hypothesized mechanisms. Future work should expand this line of inquiry and try to overcome the methodological limitations of this study, for example, by combining DNA with experimental methods or linkage analysis to demonstrate the causal influence of the power of business with regard to citizens' preferences.

In addition, single-case studies raise issues of external validity. Switzerland represents an idiosyncratic institutional structure, as no other country calls its citizens to the ballot as frequently. Nevertheless, the findings suggest broader implications. First, as Emmenegger and Marx (2019, p. 116) note, apart from direct democratic votes, "ordinary elections provide similar and additional opportunities" to influence the preference formation of voters. Second, direct democratic provisions are increasingly being extended in many parts of the world. As this study suggests, direct democracy provides no guarantee that structural power will shrink in significance. Even if business's structural power becomes less pronounced in the traditional sense of agenda control, it may become relevant as a resource that can be strategically exploited to influence voters. Moreover, while direct democratic campaigns are an ideal laboratory for studying noisy politics, business's structural power can also push public preferences in desired directions in the absence of voting, as the business campaign against Australia's Minerals Resource Rent Tax in 2010 demonstrates (Bell & Hindmoor, 2014).

The question whether organised interests are able to influence voters is related to the fundamental power relations in societies; notably, what Lukes (2005) introduces as the 'third face' of power. In emphasising ideational elements, this dimension of power directs attention to the possibility that some societal actors might be able to shape others' "perceptions, cognitions, and preferences in such a way that they accept their role in the existing order of things" (Lukes, 2005, p. 28). In some economic sectors, entire societies are structurally dependent on a small number of businesses, of which the energy field is an example. This study suggests that the structural position of such businesses might enable them to inculcate beliefs in others that further their own interests, but which are not necessarily to society's advantage (Pierson, 2016, p. 127). While Pierson rightly notes the methodological challenges of the related research agenda, the fact that the notion of power is absent from most studies that assess voters' preferences about public policies should not be used to commend a "shift…from a focus on individual behavior to one of strategic interaction among elites" (Pierson, 2016, p. 137). Instead, I contend that it would be more productive to connect both perspectives and to empirically assess how power relations play out in the individual-level process of preference construction. Future research may combine DNA with experimental methods or panel data to more clearly demonstrate the causal influence of the structural power of business.

Acknowledgments

This research has been conducted as part of the author's work within the Swiss Center of Competence for Energy Research SCCER CREST, Work Package IV 'Energy Governance.' The author acknowledges generous financial support by the Institute for Economy and the Environment (IWOE-HSG) at the University of St. Gallen and thanks Patrick Emmenegger, Jale Tosun, Frédéric Varone, Rolf Wüstenhagen, the two anonymous reviewers and the Academic Editor of this thematic issue for their valuable suggestions on a previous version of this article. Simon John Milton deserves credit for careful language editing.

Conflict of Interests

The author declares no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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COGITATIO

Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 298–310
DOI: 10.17645/pag.v8i2.2595

Article

Media Coverage and Perceived Policy Influence of Environmental Actors: Good Strategy or Pyrrhic Victory?

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Submitted: 30 October 2019 | Accepted: 29 February 2020 | Published: 2 June 2020

Abstract
In this article we analyze how media coverage for environmental actors (individual environmental activists and environmental movement organizations) is associated with their perceived policy influence in Canadian climate change policy networks. We conceptualize media coverage as the total number of media mentions an actor received in Canada's two main national newspapers—the *Globe and Mail* and *National Post*. We conceptualize perceived policy influence as the total number of times an actor was nominated by other actors in a policy network as being perceived to be influential in domestic climate change policy making in Canada. Literature from the field of social movements, agenda setting, and policy networks suggests that environmental actors who garner more media coverage should be perceived as more influential in policy networks than actors who garner less coverage. We assess support for this main hypothesis in two ways. First, we analyze how actor attributes (such as the type of actor) are associated with the amount of media coverage an actor receives. Second, we evaluate whether being an environmental actor shapes the association between media coverage and perceived policy influence. We find a negative association between media coverage and perceived policy influence for individual activists, but not for environmental movement organizations. This case raises fundamental theoretical questions about the nature of relations between media and policy spheres, and the efficacy of media for signaling and mobilizing policy influence.

Keywords
climate change; discourse networks; environment; media coverage; policy networks; social movements

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

Research on the relationship of media coverage to policy influence historically tends to assume a symmetry between mediated political communication and policy influence/power (Russell, Dwidar, & Jones, 2016; van Aelst, 2014). Previous analyses of the media-policy link specific to climate policy tend to focus either on influence within policy networks or visibility within media networks in isolation and draw inferences about how the two spheres are related based on a set of theoretical assumptions (Stoddart, Ylä-Anttila, & Tindall, 2017). Herein we move beyond theoretical assumptions by empirically examining the association between climate change related media coverage of environmental activists and environmental non-governmental organizations (ENGOs), and the influence these actors are perceived as having in a climate change policy network.

With respect to policy influence, news media are linked to public policy in two important ways. First, news media provide the backdrop for contests between various conflicting interpretive frameworks or 'framings' of issues such as climate change, mobilized by interested constituencies (Benford & Snow, 2000; Leifeld, 2017).

Second, public policy is partly made through the influence that interested constituencies exert on policy makers through news media coverage (van Aelst, 2014; Vliegenthart, Walgrave, Wouters, et al., 2016). These enactments are shaped by a constellation of factors including journalistic norms and practices, the strategies and mobilization campaigns used by activists, industry and trade, and the particular types of overarching formal political processes/opportunity structures at play (Hutchins & Lester, 2015; Leifeld, 2017; Meyer & Minkoff, 2004).

Literature on the media-policy link from the fields of agenda setting (van Aelst, 2014; Vliegenthart, Walgrave, Wouters, et al., 2016; Walgrave & Vliegenthart, 2012), policy networks (Kukkonen et al., 2018), and social movements (Gamson, 2007; Malinick, Tindall, & Diani, 2013; Meyer & Minkoff, 2004) suggests actors who garner more media coverage should be perceived as more influential in the policy sphere compared to those who garner less. Moreover, environmental actors have "stronger incentives to get media coverage than industry actors in order to reach bystander publics and put pressure on governments" (Stoddart, Tindall, Smith, & Haluza-Delay, 2017, p. 386).

However, research on the Canadian media and policy spheres suggests that even if environmental actors are more prevalent in media coverage, this media presence may not always be positively associated with policy influence and outcomes. For example, recently in Canada environmental actors are more prevalent than industry actors in climate change related media coverage. At the same time, the interests of environmentalists are rarely reflected in climate policy, while those of industry often are (Carroll, 2018; Stoddart et al., 2017).

Building on this observation we analyze how media coverage of environmental actors is associated with their perceived policy influence. We find that for individual activists (those not acting on behalf of any formal organization), more media coverage is associated with less perceived policy influence, while for environmental organizations there is a small but significant positive association between media coverage and perceived policy influence. We use interview data to expand on our findings in our discussion.

This case raises fundamental theoretical questions about how sociopolitical reality is enacted, shaped and received through media, about the nature of relations between media and policy spheres, and about whether—for activists—media success is a Pyrrhic victory (a victory that ironically leaves the victor damaged to such an extent that it is tantamount to a defeat) in terms of policy influence.

2. Literature Review

2.1. Influence

Political influence is a complex social phenomenon that can be difficult to measure in a meaningful way in terms of direct impacts on policy outcomes. Moreover, social influence may be conceived of and operationalized in a number of ways. One possibility is to approach influence as an objective, outcome-based measure to study whether an actor objectively has had an influence over other actors. For example, Vliegenthart, Walgrave, Wouters, et al. (2016) examine how media coverage of protest impacts question periods in European parliaments (an outcome measure of influence). They find that although media coverage of issues generally results in questions in parliament pertaining to these issues (evidence of a positive outcome of influence for activists), this is an indirect effect mediated through the broader issue agenda of mass media, which in turn is moderated by national political institutions.

Another approach common in network analyses conceives of social influence structurally, in terms of network centrality (the sum of all incoming and outgoing network ties an actor has) or structural equivalence (two actors sharing a similar pattern of network ties to other actors; Knoke & Yang, 2008). For example, Heaney (2014) treats perceived influence as an outcome of actors' structural location across multiple intersecting networks of communication, policy issue overlap, and coalition overlap among policy network actors. Heaney finds that playing a brokerage role in communication networks is particularly important to perceived influence, but this cannot be clearly separated from the effects of issue overlap or coalition overlap networks.

By contrast, Fischer and Sciarini (2015) gauge how perceived influence (or 'reputational power') relates to political outcomes and whether policy network actors' understanding of the reputational power of others is accurate. They find that policy network actors' assessments of each other's reputational power are generally accurate, though there may be perception bias whereby the perceived influence of closer allies is overstated. Finally, Ingold and Leifeld (2016) examine several German and Swiss policy domains and argue that perceived influence (or 'influence reputation') is a function both of the authority derived from institutionally-defined roles, as well as by actors' structural locations in social networks.

These network studies of influence use exponential random graph models to simultaneously analyze the multiple interdependent factors that contribute to the perceived influence of policy network actors (for a good overview of this approach see Lusher, Koskinen, & Robins, 2013). At the same time, these studies all focus on how perceived influence is shaped by social dynamics that are primarily endogenous to policy networks themselves, rather than focusing on how perceived influence can be shaped by external factors, such as media coverage.

We take neither of these approaches. We conceive of social influence social-psychologically, as a subjective evaluation (Gartrell, 1987) that actors make about other actors (see Heaney & Lorenz, 2013, pp. 260–261, for a good summary of this approach). This approach in-

volves directly asking actors to subjectively evaluate the influence of other actors. Heaney and Lorenz (2013) assert that "although any one respondent is likely to have an incomplete view of the field, [previous research suggests] respondents collectively are expected to provide a reasonably accurate rating of the levels of group influence" (p. 260).

While the network studies outlined above also use a subjective measure of perceived influence, our analysis offers an important addition to understanding perceived influence within policy networks. Rather than focussing on disentangling endogenous network processes, we explicitly examine an empirical correlation between media coverage and perceived influence in a policy network. This requires understanding how media and public policy are related.

2.2. Media and Public Policy

Generally, research related to media and policy falls into two streams. The first is political communication, which tends to focus on how media coverage impacts public opinion and the government's political agenda. The second is political science, which tends to focus on how media functions as an information exchange for policy actors, and how media coverage of particular issues can partly shape the political agenda (see Russell et al., 2016; van Aelst, 2014). Notably, there is little integration of the two streams (cf. Russell et al., 2016, p. 9), and both bodies of literature tend to use a set of assumptions based on linear/symmetrical relationships between media and policy (Russell et al., 2016; van Aelst, 2014). We depart from this tradition by employing the policy network and discourse network analytical frameworks.

Policy network analysis seeks to uncover the actors that are influential in policymaking and the interrelations that exist between them (Knoke, 1990; Ylä-Anttila et al., 2018). A policy network is a specific kind of social network, which can be generally defined as a set of political actors embedded within a set of structured, yet dynamic interrelations called network ties (Borgatti & Halgin, 2011). Policy network actors socially interact on the basis of particular policy issues (Leifeld, 2017; Tindall, Stoddart, & Callison, 2018; Ylä-Anttila et al., 2018). Actors include "government representatives, but also opposition parties, businesses, social movements, think-tanks, and scientists" (Stoddart et al., 2017, p. 389).

We also integrate a media discourse network perspective into our analysis. Discourse networks are constituted by political discourses, which are "verbal interactions between political actors about a given policy" (Leifeld, 2017, p. 302). They involve political actors—including politicians, environmentalists, scientists, think tanks, business leaders, NGOs, and others—making public statements about their policy beliefs, goals, and preferences (Leifeld, 2017). Some such actors are those involved in social movements.

2.3. Social Movements and Media Coverage

Studies of media coverage of social movements suggest activists seek media coverage in order to build up reputation, enter into policy debates, impact public policy, and exert influence over policymaking (Kukkonen et al., 2018; Malinick et al., 2013; Wilkes, Corrigall-Brown, & Myers, 2010). Social movements engage in issue framing to try to reshape the frameworks people use to interpret how political issues impact their daily reality (Benford & Snow, 2000; Snow, Rochford, Worden, & Benford, 1986). This potentially influences bystanders to identify with the position of activists, while also encouraging people to mobilize (Snow et al., 1986).

For example, Stoddart, Smith, and Tindall (2016) found activists used the COP15 climate meeting in Copenhagen as a 'political opportunity' (Meyer & Minkoff, 2004) to intervene in international media narratives and re-frame Canada's international reputation as a climate leader. Activists drew international attention to Canada's poor climate change performance, generating public awareness and political pressure (Stoddart et al., 2016). This demonstrates that environmental groups are able to act as "key organizational actors" (Stoddart et al., 2016, p. 260) who play a role in structuring national and international news media discourse, and "articulate substantive claims" (Stoddart et al., 2016, p. 260) toward other political actors.

News media remain a key "field of engagement among a range of actors with a stake in climate change policy debate" (Stoddart et al., 2017, p. 386). The link between climate change and media has been extensively studied since about the mid 1990s, both within and across multiple societies, and especially in Europe and North America (Tindall et al., 2018). The type and amount of climate change news coverage differs substantially across countries (Boykoff, 2011). Over the last two decades the extent of media coverage of climate change has fluctuated, rising in concert with major media events such as COP meetings and the release of the Intergovernmental Panel on Climate Change (IPCC) and other reports, subsiding in the trough between (Boykoff, 2011; Broadbent et al., 2016). More recently, world media attention to climate change has been steadily rising (Boykoff, Katzung, & Nacu-Schmidt, 2019).

Coverage in Canada is cyclical and event-driven. Between 1997 and 2010, coverage of climate change in Canada's two major national newspapers—the *Globe and Mail* and *National Post*—rose to a peak alongside the release of the fourth IPCC report and the Nobel Peace Prize being awarded to the IPCC and to Al Gore, and declined thereafter (Stoddart, Haluza-DeLay, & Tindall, 2016). As of August 2019, coverage in Canada is up by about 38% compared to August 2018 (Boykoff et al., 2019). Canadian coverage is increasingly oriented toward policy debates and discussion about proposed solutions to climate change (Stoddart & Tindall, 2015; Young & Dugas, 2011).

In this analysis we are interested in whether, for environmental actors (individual activists and ENGOs), media coverage like that outlined above is positively associated with perceived policy influence. We examine the empirical correlation between media coverage of these environmental actors and the extent to which other policy actors subjectively perceived environmental actors as being influential in climate change policy making. Based on the literature above, we propose two main hypotheses.

2.4. Hypotheses

The literature outlined above suggests that environmental actors are incentivized to garner media attention, and that those who have more media coverage should be perceived as more influential by policy actors compared to actors who have less media coverage. However, regarding the second assertion, research on the Canadian media and policy spheres suggest the opposite may be true for individual environmental activists. To assess these claims, we test the following hypotheses:

> H1: Being an environmental actor (either individual activist or environmental organization) is positively associated with media coverage.
>
> H2: Being an environmental actor (either individual activist or environmental organization) mediates the media coverage—perceived influence association, such that media coverage is negatively associated with perceived policy influence.

For a variety of reasons, media coverage may not always translate into perceived policy influence. What appears in the media is influenced by processes (such as journalistic norms) that operate beyond the importance of particular policy arguments, or the extent to which they appear compelling (Boykoff & Boykoff, 2007; Callison, 2014). Also, debates in media may not accurately capture the "complexities of social interaction that occur within policy networks" (Stoddart et al., 2017, p. 387). Moreover, key policy actors may vary in their "need and ability to get media coverage" (Stoddart et al., 2017, p. 387). For example, influential actors may engage in 'strategic invisibility' (Lester & Hutchins, 2012), withdrawing from public communication about environmental issues to avoid negative media coverage. Therefore, a positive association between media coverage and perceived policy influence should not be treated as axiomatic but rather as an empirical question. We now turn to a discussion of our data and methods.

3. Methods

3.1. Data

The data were gathered as part of the larger COMPON (Comparing Climate Change Policy Networks) project, which involved a discourse network analysis (Leifeld, 2017) of print news coverage of climate change in Canada, and interviews with/surveys completed by Canadian climate change policy actors. The media discourse data used here focuses on articles (N = 1,140) from Canada's two main national newspapers (*Globe and Mail* and *National Post*) during the period between June 2006 to June 2010. This period was chosen because it encompasses critical events including the Copenhagen COP meetings, which inspired contention and mobilization, and thus media coverage. These articles were analyzed using Discourse Network Analyzer (Leifeld, 2015), to identify actor agreement or disagreement across a range of concept statements pertaining to climate change governance in Canada. This enabled us to generate a detailed event list used to derive our media coverage variable.

In the interview and survey phase of the project, 77 respondents were interviewed beginning in February 2015, and 44 respondents completed online surveys between June 15th, 2015 and October 13th, 2016. The sample was designed to be representative of actors involved in climate change policy making in Canada. Pertinent actor types represented in the sampling frame included politicians, government bureaucrats, environmentalists, scientists, think tanks, business leaders, NGOs, and others.

The survey included five sections asking respondents about their network behaviors with respect to a list of network 'targets' (policy actors) that were systematically identified by the Principle Investigator of the original COMPON project. All of the organizations associated with survey respondents also appeared as targets in the survey. There are 171 targets in total, representing the range of policy-relevant actors. Our analysis is based on these 171 target actors. The survey question we focus on herein asked respondents to indicate who out of the 171 target actors they perceived to be influential in domestic climate change policy.

3.2. Measures

Descriptive statistics for our main and control variables are outlined in Table 1. We conceptualize media coverage as the total number of media mentions an actor received in Canada's two main national newspapers—the *Globe and Mail* and *National Post*—over the duration of our study. We conceptualize perceived policy influence as the total number of times an actor was nominated by all other actors in a policy network as being perceived to be influential in domestic climate change policy making in Canada. These represent 'media coverage' and 'policy influence' respectively in the analyses below.

Our main independent variable is actor type, summarized in Table 2. Each survey target was assigned one of eight possible actor 'types' based on some key dimensions such as the sector they were located in (for e.g., civil society, academia, government, business, etc.), and the type of activity they undertook (for e.g., ac-

Table 1. Descriptive statistics for non-categorical variables (N = 171).

Variable	Mean	*S.D.*	Min	Max
Dependent variables				
Perceived influence	6.46	6.24	0	23
Media coverage	7.04	12.16	0	78
Interaction terms				
Activist X media mentions	0.18	1.38	0	17
ENGO X media mentions	0.82	3.69	0	29
Control variables				
% Agree w/business	8.90%	19.81%	0%	100%
% Agree w/government	9.48%	17.16%	0%	100%
% Not in business/government	50.30%	41.10%	0%	100%

tivism/advocacy, research, governing, business, etc.).

Each actor type is modelled as a binary variable that equals 1 if the target matches that type, and 0 if not. For example, an environmental organization target would have a value of 1 for the 'ENGO' type variable, and 0 for all other type variables. We excluded the government type variable, which acts as our referent type. It is important to include government actors in our analysis because they are a key part of the media/policy link (Vliegenthart, Walgrave, Baumgartner, et al., 2016).

Preliminary analysis indicated a potential 'crossover interaction' (Baron & Kenny, 1986, p. 1174) between media coverage and perceived policy influence for individual activists and environmental organizations. Therefore, in our final model we interact media coverage with being an ENGO and with being an individual activist. These interaction terms are summarized in Table 1 as well. These are included to assess the extent to which being an individual activist or environmental organization shapes the correlation between media coverage and perceived policy influence. This speaks directly to our main hypotheses related to policy influence.

We include variables to control for the percentage of an actor's media coverage that aligns with the same themes associated with coverage of business and government actors. We also include a variable for the percentage of an actor's coverage that is unrelated to either business or government coverage.

Finally, we include two further dichotomous variables—one controlling for whether actors are federal/national versus sub-national, and one controlling for whether actors are organizations versus individuals. While we do include individual activists as an actor type, there are other actors in the analysis who are individuals (for example, media actors).

4. Analytic Strategy

We use negative binomial Poisson regression, because our main dependent variables are count measures that follow the Poisson distribution and exhibit some over-dispersion (Cameron & Trivedi, 2013, pp. 80–85). Preliminary analysis showed that neither zero-inflated nor zero-truncated regression were a better a fit to the data (for details on model selection see Cameron & Trivedi, 2013; Wilson, 2015). We use Huber–White robust standard errors to account for unequal error variance across observations. This is a common problem with generalized linear regression models, including negative binomial regression. Huber–White robust standard errors provide asymptotically correct standard errors for models where the variance of residuals is unequal across observations (Cameron & Trivedi, 2013, pp. 84–85).

The first model uses media coverage as the dependent variable to assess the factors associated with media coverage that an actor receives. The second model is the

Table 2. Descriptive statistics for actor type variable.

Actor type	Frequency	%
Government (reference cat.)	45	26.32%
Business	30	17.54%
Research	27	15.79%
ENGO	24	14.04%
Media	21	12.28%
Activist	12	7.02%
Think Tank	6	3.51%
NGO	6	3.51%
Total	171	100.00%

primary model, which regresses media coverage on perceived policy influence. To disentangle the link between media coverage and perceived policy influence for individual activists and environmental organizations, we include our two interaction terms in this model. We now turn to our results.

5. Results

The results of our first model related to media coverage are presented in Table 3. All else being equal, actors perceived as more influential are associated with more media coverage. Organizations receive less media coverage compared to individuals, and federal/national actors receive more coverage compared to non-federal/national (regional) actors.

Looking at our actor type variables (relevant to H1) reveals that compared to government actors, business actors and individual activists receive less media coverage whereas there is no significant difference for environmental organizations, or any other actor type.

The results of our second analysis related to policy influence are presented in Table 4. Higher values of media coverage are significantly associated with higher numbers of nominations as being perceived as influential in policy networks ($p < .05$). The same holds for being a federal/national actor compared to non-federal/national (regional) actors ($p < .01$).

The higher the percentage of an actor's media coverage that aligns with the same themes associated with coverage of business, the more influential they are perceived to be ($p < 0.10$). There seems to be no significant association between perceived policy influence, and either (1) the percentage of an actor's coverage that aligns with government, or (2) the percentage of an actor's coverage that is not related to business or government themes.

Looking at our actor type variables suggests that, compared to being a government actor, being a business, research, or NGO actor is associated with fewer nominations of being perceived as influential.

Turning to the interaction terms (relevant to H2) we find that for individual activists the association between media coverage and perceived policy influence is significantly negative ($p < .001$), whereas for environmental organizations the association is significantly positive ($p < .001$). For individual activists, more media mentions are associated with fewer perceived policy in-

Table 3. Negative binomial Poisson regression of perceived policy influence on media coverage, with robust standard errors.

Media coverage	Model 1	Model 2
Perceived influence	0.093***	0.093***
	(0.014)	(0.014)
Attributes (1/0)		
Organization (0 = individual)	−0.467	−0.569*
	(0.241)	(0.289)
Federal/National (0 = regional)	0.442*	0.623**
	(0.205)	(0.214)
Actor type (1/0)		
Activist		−1.260*
		(0.615)
ENGO		−0.267
		(0.272)
Business		−0.633*
		(0.267)
Media		−0.254
		(0.325)
Research		0.399
		(0.313)
NGO		−0.273
		(0.708)
Think Tank		−0.568
		(0.330)
Constant	1.259***	1.434***
	(0.252)	(0.328)
Pseudo R^2	0.045	0.059
BIC	−584.082	−569.058
N	171	171

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 4. Negative binomial Poisson regression of media coverage on perceived policy influence, with robust standard errors.

Perceived policy influence	Model 1	Model 2	Model 3	Model 4
Media coverage	0.025***	0.020***	0.015**	0.011*
	(0.006)	(0.006)	(0.006)	(0.005)
Attributes (1/0)				
Organization (0 = individual)	0.149	0.121	0.030	0.019
	(0.174)	(0.163)	(0.207)	(0.205)
Federal/National (0 = regional)	0.518***	0.624***	0.505**	0.545**
	(0.139)	(0.145)	(0.163)	(0.163)
Coverage type				
% Agree w/business		0.719†	1.202*	1.268†
		(0.390)	(0.492)	(0.500)
% Agree w/government		0.776†	0.416	0.453
		(0.431)	(0.441)	(0.445)
% Not in business/government		0.007	0.212	0.203
		(0.193)	(0.201)	(0.201)
Actor type (1/0)				
Activist			−0.101	0.113
			(0.347)	(0.360)
ENGO			0.030	−0.298
			(0.212)	(0.269)
Business			−0.563*	−0.599*
			(0.260)	(0.261)
Media			0.059	0.050
			(0.198)	(0.194)
Research			−0.923*	−0.917**
			(0.291)	(0.293)
NGO			−0.921*	−0.925†
			(0.495)	(0.494)
Think Tank			−0.050	−0.059
			(0.354)	(0.358)
Interactions				
Activist X media coverage				−0.130***
				(0.033)
ENGO X media coverage				0.044***
				(0.012)
Constant	1.316***	1.174***	1.423***	1.450***
	(0.175)	(0.200)	(0.248)	(0.247)
Pseudo R^2	0.028	0.036	0.056	0.063
BIC	−681.579	−672.492	−651.802	−646.420
N. Obs.	171	171	171	171

Notes: † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

fluence nominations. For environmental organizations, more media mentions are associated with more influence nominations.

Both of our hypotheses are partially supported by our results, and we have some interesting findings with respect to the association between media coverage and perceived policy influence for individual activists. To clarify our results and draw out important implications for theory and future research, we now turn to a discussion of these findings.

6. Discussion

6.1. A Pyrrhic Victory

Recall that the interaction terms in Table 4 represent a 'crossover interaction' (Baron & Kenny, 1986, p. 1174). In our case, being an individual activist moderates the association between media coverage and perceived policy influence such that the association is negative. In contrast, this association is positive for environmental organizations.

This moderation effect comes into play for actors who had at least eight media mentions. For reference, the average number of media mentions for individual activists in our data is about eight, and about nine for environmental organizations. We can use our regression model along with these averages to predict the total number of nominations of being influential that an individual activist, or an environmental organization, may receive. Using eight media mentions, activists are predicted to get four influence nominations while environmental organizations are predicted to get 10 ($p < .001$).

To better illustrate this interaction, Figure 1 graphs adjusted predictions of number of nominations of being perceived as influential for individual activists and environmental organizations. To calculate these predictions, we set the variables for percent of an actor's media coverage related to business, government, and neither, to their mean values. We also assume that individual activists and environmental organizations are both federal-level actors (this is a more conservative assumption for activists, since many activists are not federal actors). Finally, we set the organization variable accordingly; for environmental organizations the variable equals 1, whereas it equals 0 for individual activists.

When we consider environmental organizations, neither of our hypotheses is supported. Our results suggest that environmental organizations receive about the same amount of coverage as government actors (Table 3), and that higher numbers of media mentions are associated with *more* nominations as being perceived as influential (Table 4). When we consider individual activists, H1 is again not supported—individual activists receive *less* coverage than do environmental organizations (Table 3). However, for individual activists, H2 is supported—for individual activists, higher numbers of media mentions are associated with *fewer* nominations of perceived policy influence (Table 4). Thus, in certain contexts media coverage may actually be a Pyrrhic victory for individual activists.

In considering existing theoretical assumptions about the relationship between media visibility and perceived policy influence, our analysis suggests that there are other contextual factors—in our case, the type of actor under consideration—that play an important role in shaping this relationship. Our analysis demonstrates that theoretical assumptions of a positive association between media coverage and perceived policy influence need to be carefully examined. This symmetrical relation should not be assumed but evaluated case by case. Future research should seek to elaborate on the conditions wherein a positive or negative relation holds.

Recall from our earlier discussion that media coverage may not be associated with perceived policy influence due to a variety of factors—journalistic norms (Boykoff & Boykoff, 2007; Callison, 2014), the complexities of policy networks not captured in mediated debates (Stoddart et al., 2017), and variations in policy actors' need for, and ability to garner media coverage (Stoddart et al., 2017).

In addition, there are many reasons why actors might be selected for media coverage beyond being perceived as influential by other policy actors. For example, policy networks can provide a kind of social capital, and media actors can be drawn into policy networks through this social capital structure to identify their news sources (Malinick et al., 2013). Journalists do tend to have established relationships with particular sources and rely on them due to considerations of time and accuracy, and the ability of sources to provide reliable, concise, and coherent responses. This is likely a part of the effect of perceived influence on media coverage and is currently being explored by the authors elsewhere. Nevertheless, we cautiously offer potential explanations of our key findings related to individual activists.

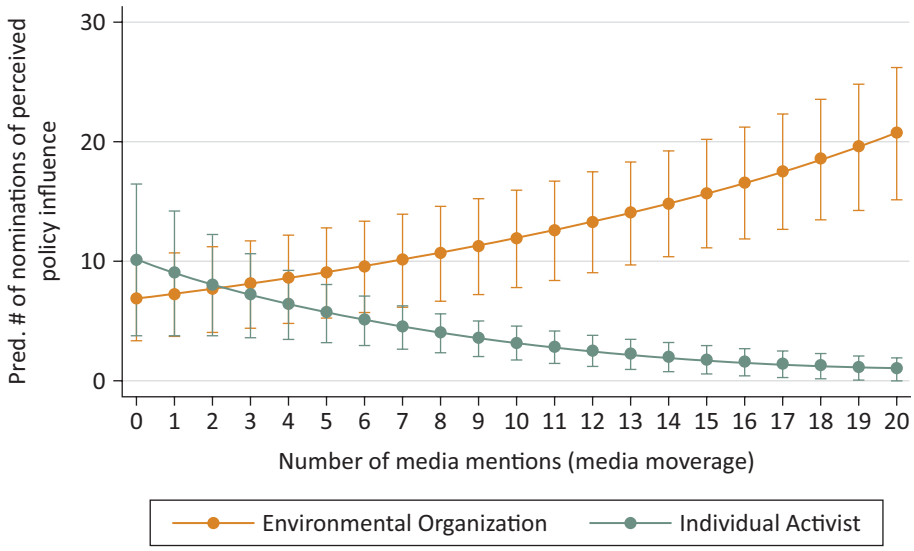

Figure 1. Adjusted predictions of perceived policy influence nominations based on number of media mentions, with 95% confidence intervals.

One possibility is that there is some form of institutional legitimacy afforded to environmental organizations as a result of 'NGOization'—a process whereby grassroots groups and their networks "shift from rather loosely organized, horizontally dispersed, and broadly mobilized social movements to more professionalized, vertically structured NGOs" (Lang, 2013, p. 62). NGOs seek to "influence decision making by gaining some degree of insider status in institutions or in organizations that initiate, prepare, legislate, or execute policy change" (Lang, 2013, p. 22).

Moreover Lang (2013, p. 64) argues:

> Emphasis is placed on organizational reproduction and on the cultivation of funding sources. It frequently results in increased recognition and insider status in NGOs' issue-specific policy circles. One effect might be the containment and reframing of more radical messages; another effect might be an orientation toward institutional advocacy and away from public displays of dissent.

By operating outside of (and in many ways overtly challenging) this institutional context, individual activists may have a legitimacy 'penalty' levied against them. This is consistent with literature on insider and outsider activist strategies (Fogarty, 2011; Grant, 2004), and with literature on the sociology of knowledge that shows organizational characteristics (such as funding) acting as a "common heuristic for judging credibility and broad political 'allegiances"' (McLevey, 2014, p. 55; see also Choudry & Kapoor, 2013).

We can see the contours of these processes in our interview responses. When asked about the role of environmentalists in climate change politics, one prominent government actor explains how the use of radical messaging, displays of dissent, and challenging institutional legitimacy leads to a lack of perceived policy influence:

> I have worked with some [NGOs] that are really very capable, like really smart and strategic, people who kind of look at it and figure out what is the best way for them to engage and make a difference and who they can influence and how to influence them. So, some of the most impressive people I know work in NGOs. But I have also met some people that are just kind of useless, frankly. I mean…some people…sit there and say "I do not agree with this process, I do not think industry should even be at this table. I do not think any standard that anyone has set was tough enough." But they did not really shape anything. Everybody in the room, including other NGOs, were like "duly noted" and then we went back to trying to reach an agreement. Right like if you did not want to participate, why are you here?

Another possibility involves the 'devil shift' (Sabatier, Hunter, & McLaughlin, 1987) and 'angel shift' (Leach & Sabatier, 2005) phenomena. The devil shift is the tendency of political actors to underestimate their own political influence, while simultaneously overestimating the influence and malice of their opponents (Sabatier et al., 1987). In contrast the angel shift is the tendency for political actors to exalt themselves and their political partners (Leach & Sabatier, 2005). These are social-psychological processes mediated through political discourse.

We see these processes in some of our interview responses. When asked about potential solutions to climate change in Canada, one activist reveals how the failure of political actors to take meaningful action makes them a more difficult obstacle to overcome, requiring more drastic action:

> If you looked at it when it first started, I would tell you energy efficiency and incremental improvements are the best way to go about it because then you can achieve it without too many disruptions to the economy. That is no longer the case. Now we need to have disruptive action in order to make the most effective changes that we can as quickly as we can. So, in fact…what we have to do is becoming harder. And there is still not a recognition in politicians…that extreme things have to be done in order to avert the disaster that is awaiting us.

When asked about the current state of climate change politics in Canada, the same activist extolls the virtue of their own position in the face of opposition:

> The politics of climate change in Canada are very negative….It has been used as a tool by the present federal government to beat up on previous governments and to offend….So it has been a very bitter kind of battle….We have a strong desire to do the right thing but…if we are not prepared to cap our emissions we are not going to be able to achieve anything.

Moreover, the constellation of actors in the field of environmental policy also shapes how media coverage affects policy influence (van Aelst, 2014). Earlier we outlined how the Canadian environmental policy field is largely characterized by interlocking relations between industry and state actors (Carroll, 2018). It is also true that media coverage of sensational issues like the environment has a high likelihood of influencing the public and the policy agenda (see van Aelst, 2014, pp. 239–240).

When we consider this alongside our preliminary explanations and interview data outlined herein, it is reasonable to argue that there may be some push back—at least from industry and/or government actors—against individual environmental activists, whose main targets are industry and state actors and existing political institutions, and who are highly motivated to garner media coverage. In contrast, the more consensus-oriented strategies of environmental organizations could explain their relatively more influential position. Alternatively, individ-

ual activists in more radical groups may be more prominent in media coverage, while those in more mainstream groups may be less (cf. Malinick et al., 2013).

While this is by no means an exhaustive exploration of possible explanations for our findings with respect to individual activists, these two explanations are plausible, supported by literature, and reflected in our interview data.

6.2. Limitations

We acknowledge that the relationship between media coverage and perceived policy influence is bidirectional. That is, media coverage may be associated with perceived policy influence, and being an influential policy actor may garner more media coverage. To fully explore this question requires analyzing longitudinal data. In an ideal research design, researchers could try to model how this relationship changes over time, how the introduction of new actors into a policy domain affect this relationship, or how different strategies used by actors shape this relationship. While these are important questions, they are outside the scope of our analysis.

First, our analysis is not longitudinal but cross-sectional. We assert that although a longitudinal design is ordinarily considered a methodological improvement on a cross-sectional one, it still may not adequately address the question of bidirectionality. For example, consider the bidirectional inter-relations between the issue attention cycle and media coverage (Downs, 1972), or the many associations between media coverage, actor influence, and political opportunity structures. Moreover, cross-sectional methods can be quite robust. Recall that exponential random graph models—a cross-sectional method specifically designed to analyze network data—have proven successful at disentangling the complex network-based processes that shape influence in political networks (see Fischer & Sciarini, 2015; Heaney, 2014; Ingold & Leifeld, 2016).

Second, we are examining the correlation between media coverage and perceived policy influence. In terms of practicality, answering longitudinal questions is easier to do with media data than with network data, given access to actors and the resources required to gather network data. Nevertheless, our analysis is one of the first to empirically examine this correlation, the first we are aware of using Canadian data, and an important addition to extant literature on social influence in policy networks as well as literature on social movements and media.

A third limitation of our analysis involves our measure of perceived policy influence. We have evidence of an empirical correlation between media coverage and perceived policy influence and examine that herein. However, it may be argued that no single actor in our policy network has complete information about all other actors in our network, and that evaluations of influence could be shaped by personal relations between network actors (Heaney & Lorenz, 2013).

We argue—in line with Heaney and Lorenz (2013)—that our measure is valid for two main reasons. First, actors in our network are "uniquely knowledgeable of the inner workings" (Heaney & Lorenz, 2013, p. 261) of climate change governance in Canada. This agrees with Fischer and Sciarini's (2015) findings outlined earlier that network actors' understanding of the reputational power of others is accurate. Second, our sample of policy actors was designed to be representative of the climate change policy domain in Canada and has very good coverage of the key actors involved in climate change governance in Canada. We will investigate other aspects of this relationship in future analyses.

Finally, our discourse network data precedes our policy network data by about five years. It is not clear whether or not this improves the validity of our analysis (by acting as an informal time lag), so readers should keep this in mind when considering our findings.

7. Conclusion

In this article we analyze how media coverage for individual environmental activists and environmental movement organizations is associated with their perceived policy influence in a climate change policy network. We find that media coverage may be a Pyrrhic victory for individual activists, for whom higher levels of media coverage do not correspond with higher levels of perceived policy influence. This raises fundamental theoretical questions about common symmetrical assumptions about the relationship between media coverage and policy influence (see Russell et al., 2016; Stoddart et al., 2017; van Aelst, 2014), and the efficacy of media for signaling and mobilizing policy influence.

Our findings demonstrate these assumptions are only partly correct and should not be assumed. Rather, the link between media and policy should be an empirical question, not an a priori assumption. The complex processes shaping media attention and policy influence may be similar but are also independent. They play out in different sociopolitical contexts and are shaped by different mechanisms. This highlights the importance of further research that bridges media analysis and policy network analysis in order to help us better understand how visibility, power/influence, and policy influence work across media spheres and policy networks.

Our study also addresses the "lack of connections between studies of the media and studies of public policy processes" (Russell et al., 2016, p. 2), and calls for research at the level of individual political actors, to help clarify mechanisms that explain "why and when political actors react to media coverage" (van Aelst, 2014, p. 234). Our findings suggest that in a context where government is increasingly hostile toward climate science and climate activism (such was the case in Canada during data collection for this project), media coverage of individual activists may lead policy network actors to perceive activists as less influential than environmental organizations.

We put forth two potential explanations for these findings. The first is related to processes of NGOization and the various ways that political actors use heuristics to judge credibility and political allegiance. The second is related to the devil shift and angel shift phenomena. Both explanations are supported by literature and our interview data. Ultimately our goal is to provide empirical, substantive findings to improve our understanding of climate change governance, environmental activism, and the media-policy link. We will explore some of these explanations in future analyses, and the current analysis provides a good foundation for these, and other similar studies.

Acknowledgments

Jeffrey Broadbent, Randolph Haluza-Delay, Philip Leifeld, Keiichi Satoh, and participants of the October 2019 COMPON workshop at the University of Bern, Switzerland, provided valuable input throughout the development of this project. The authors would like to acknowledge the research assistance of Noelani Dubeta, Michelle Hay, Emily Maynard, and Georgia Piggot. Funding for this research was provided by the Social Sciences and Humanities Research Council of Canada. This article utilizes comparative research methods and data collection instruments collaboratively developed by the program on Comparing Climate Change Policy Networks (COMPON, http://compon.org) initiated and led by Jeffrey Broadbent, University of Minnesota, with Co-Principal Investigators Dana R. Fisher and Katsumi Matsumoto and funded by the US National Science Foundation [grant number BCS-08270069]. An earlier version of this article was presented at the October 2019 COMPON workshop at the University of Bern, Switzerland.

Conflict of Interests

The authors declare no conflict of interests.

Supplementary Files

Supplementary material for this article is available online in the format provided by the authors (unedited).

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COGITATIO

Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 311–325
DOI: 10.17645/pag.v8i2.2573

Article

Discourse Networks and Dual Screening: Analyzing Roles, Content and Motivations in Political Twitter Conversations

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Submitted: 21 October 2019 | Accepted: 10 February 2020 | Published: 2 June 2020

Abstract
The increasing relevance of social networking platforms is accompanied by a growing number of studies using digital trace data. However, most studies still lack further understanding of the data-generating process. This analytical gap can be directly attributed to the prevalence of quantitative approaches, as only qualitative work is able to generate these insights. The broad methodological toolset of discourse network analysis addresses this shortcoming as it combines both qualitative and quantitative approaches. The present study therefore employs discourse network analysis in order to (1) determine different user groups' varying role as senders and recipients of targeted online conversations, (2) identify and compare Twitter users' (simultaneous) reference to different forms of conversational Twitter content, and to (3) asses the motivation of @message authors to direct particular Tweets at particular user groups. To this end, this study analyzes @messages during the *BBC* program 'Question Time' on 2nd of June 2017—the final media encounter of Prime Minister Theresa May and Jeremy Corbyn in the context of the 2017 UK election campaign. We draw on the theoretical background of Maarten Hajer's discourse coalitions approach in order to investigate the preconditions for the formation of discourse coalitions in new and emerging virtual discourse arenas. Thus, our work not only mirrors the focus in existing literature on Twitter usage during high-profile political media events, but also emphasizes Twitter's unique features for interactive exchange. This article identifies different forms of meta-talk and policy issues, which vary in both their general popularity with Twitter users as well as their interconnectedness. Furthermore, our analysis uncovers the motivation behind the decisions of @message authors to send particular @messages to certain groups of Twitter users. Finally, we could establish that media events only temporarily affect the topical foci of @message authors.

Keywords
discourse network analysis; Jeremy Corbyn; political campaigns; Theresa May; TV debate; Twitter; UK elections

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

The complexity of political processes results to a large degree from the blurriness and subjectivity of perceptions and interpretations which actors adopt during the political and public discussions that precede the decision-making process. The 'argumentative turn' in policy analysis addresses this complexity by explaining policy developments particularly through patterns of collectively constructed perception and argumentation (Janning, Leifeld, Malang, & Schneider, 2009, p. 59). Drawing on symbolic interactionism, this discursive construction of shared interpretations came to be defined as 'framing' (Entman, 1993; Leifeld & Haunss, 2012).

Over the last decade, the argumentative turn produced a growing number of literature on policy discourse and discourse networks with several studies focusing on contemporary policy debates to map ideological net-

works over time (e.g., Fergie, Leifeld, Hawkins, & Hilton, 2019; Leifeld & Haunss, 2012). At the outset, most of these studies analyzed contemporary policy issues by primarily relying on data generated from newspaper articles (e.g., Fergie et al., 2019; Leifeld & Haunss, 2012) or the content of Congressional hearings (e.g., Fisher, Waggle, & Leifeld, 2013). However, the largely unpredicted results of the US presidential elections and the Brexit referendum in 2016 not only challenged the validity of traditional political science data sources, but also underlined the increasing relevance of social networking platforms for framing political problems and determining the salience of policy issues. This development resulted in a large and constantly increasing body of political science literature, which refers to digital trace data for assessing and predicting collective political opinion formation.

Yet this new source of data also produces new—and only partly considered—challenges: In contrast to other fields of study that employ digital trace data, political research on social media is always situated in the tension field between the logics of traditional news reporting and the rationale of 'new media' venues. On the one hand, most of these studies focus on the online deliberation of election campaigns (Ginnis & Miller, 2017) which attract a particularly large set of contributions during campaign-related 'media events' like TV debates and the announcement of election results (e.g., Ceron & Splendore, 2019). Thus, the respective studies do not examine 'unique' virtual discourses, but rather investigate practices of 'dual-screening' (e.g., Camaj & Northup, 2019; Gil de Zúñiga & Liu, 2017), i.e., how online communities reflect on an agenda set by the traditional media and deliberated by established political elites. On the other hand, the majority of political social media research draws on digital trace data from the microblogging service Twitter. In contrast to its competitors like Facebook or Instagram, Twitter is characterized by its hybrid character between news medium and social network (Chadwick, 2017) as well as by its design as an 'end-user innovation' (Johnson, 2009) that allows its users to develop conversational conventions, which are subsequently embedded in the platform's technological software structure. Thus, Twitter provides its users with multiple modes of content exchange, which either mirror the unidirectional top–down 'broadcast' rationale of traditional news reporting or diverge from this logic and exemplify the 'conversational' interactive and reciprocal nature of social media (cf. Supplementary File): Firstly, Twitter users' decision on whether to add a hashtag to their Tweet implies the choice between just 'broadcasting' their message to their subscribers or sharing their contribution with a—largely unfamiliar—audience that discusses the respective hashtag. Secondly, a Twitter user can react to another user's Tweet by either retweeting—i.e., rebroadcasting—the other user´s original messages or by entering a directed conversation with the respective user. For the latter way of interaction, Twitter users integrate another username in the message text—preceded by an @-symbol—and are thus "able to send directed messages to the mentioned user's inbox" (Borondo, Morales, Benito, & Losada, 2014, p. 404). While Twitter users mostly stay unaware of being retweeted, they receive a notification when they are mentioned. This increases the probability of direct communication and underlines the conversational aspect of the @message mechanism.

In summary, the confrontation between the top–down broadcasting approach established by traditional political and media elites and social media's conversational bottom–up disruption of that logic should be particularly visible in @message conversations which are delineated by a particular hashtag and concern a particular media event covered by the established media. While some previous works reflect on this tension by comparing the different roles of elite and non-elite Twitter users in 'dual-screening' @message conversations (e.g., Lin, Keegan, Margolin, & Lazer, 2014), there is a lack of research on why particular user groups engage in political Twitter conversations and what they actually discuss. However, this information is crucial in order to assess if dual-screening Twitter discourse allows the collective formation of frames and discourse coalitions in the first place. Therefore, the present article proposes a new and more comprehensive approach for examining @messages authors' (1) different roles, (2) simultaneous reference to different topics or storylines, and (3) issue-related motivation to address particular users during a media event.

2. Theory, Previous Research and Research Interests

Hajer (1993) identifies two factors, which support a discourse coalition's success. On the one hand, to feature more frequently in the media allows a discourse coalition to dominate the discourse. On the other hand, attracting a higher number of voters requires the respective coalition to integrate its core frames into a consistent storyline. In particularly important political phases such as election campaigns, these storylines and frames of policy issues are crucial for the formation and sharing of opinions (Kangas, Niemelä, & Varjonen, 2014) as well as for eventually persuading the voters. Members of a discourse coalition are held together by the construction of a common understanding of the nature of the problem under consideration (Hajer, 1993).

In this context, we aim at providing a starting point to investigate the presence of these processes for the formation and framing of discourse coalitions in 'dual-screening' virtual discourse. More particularly, by zooming in on the directed interaction between Twitter users commenting on a particular media event in context of a particular election campaign, our study examines three crucial preconditions for the actual occurrence of political discourse and the formation of discourse coalitions in Twitter conversations. Firstly, we investigate how the

configuration of exchange between different groups of users—and thus their capacity to build or influence discourse coalition—in 'new media' diverges from the respective structures in 'old media.' Secondly, we uncover both the actual content of as well as the overlap of content between different Twitter users' discursive contributions. Particularly the latter aspect allows us to assess the most important precondition for the development of shared frames and coalition building, namely if Twitter users actually debate about the same topics and if these topics are integrated into a comprehensive discourse structure. Finally, we investigate if Twitter users distinguish between the recipients of their discursive efforts depending on the respective Tweet's content. We can therefore assess whether Twitter users are generally able to form strategically successful discourse coalitions, which are delimited by particular issues, or instead randomly talk to the 'void.'

2.1. Roles in @Message Discourse: Who Messages Whom?

Previous studies that compare the different roles of elite (e.g., politicians, media actors) and non-elite Twitter users (e.g., citizens, bloggers) in 'dual-screening' @message conversations share two main insights (cf. Jungherr, 2015): On the one hand, elite users are able to translate their privileged status as receivers of public attention during media events into the 'Twittersphere' and are therefore more likely to receive @messages than non-elite users. On the other hand, direct interaction with the audience requires 'more commitment' than the simple top-down broadcasting to which political/media elites are more accustomed, which is why they are also less likely to engage in @message conversations than 'average' Twitter users or bloggers. In order to assess different user groups' potential to influence the salience of issues and to form discourse coalitions, our first research question aims at a more fine-grained review of the validity of these findings for the investigated dataset:

> RQ1: How does the volume of received and sent @messages during media events differ between elite Twitter user groups (like politicians, parties, journalists and media venues) and non-elite Twitter users (like 'average' citizens and bloggers)?

2.2. Content of @Message Discourse: What Is the Content of the Messages and How Does It Overlap?

While as of yet there is no systematic research that focuses on the content of political @messages, some studies have already investigated the issues referenced by Twitter users during TV debates. These works suggest that Tweets can generally be classified as either 'policy debate' or 'meta-talk'—i.e., Tweets, which do not "correspond to any political issue, but [rather constitute] debate about the debate" (Kalsnes, Krumsvik, & Storsul, 2014, p. 317). This research also indicates that (particularly non-elite) Twitter users involved in 'dual-screening' prefer meta-talk to policy debates (Freelon & Karpf, 2015). Our second set of research questions aims at enhancing these insights not only by breaking down both concepts into more fine-grained and inductively derived manifestations and comparing their respective salience in Twitter users' @messages. We also utilize the toolset of DNA to assess if users actually integrate multiple topics into an overarching discourse strategy and evaluate the network structures resulting from the simultaneous reference of Twitter users to these manifestations of content. Thus, we can determine the linkages between and the centrality of different types of content of @messages as well as how likely an @message author who references a particular policy topic or form of meta-talk also contributes to another manifestation of policy debate or meta-talk. This enables an assessment of the structural precondition for the development of shared beliefs—and accordingly discourse coalitions. In addition to this, analyzing the policy debate allows us to assess if and how the policy issues discussed in @message conversations mirror the media event's agenda during the course of the debate:

> RQ2.1: How do (different manifestations of) policy debate and meta-talk diverge in respect to their general popularity with the senders of @messages? Which policy topics and forms of meta-talk are most often referenced in @messages during TV debates?
>
> RQ2.2: How do different manifestations of policy debate and meta-talk diverge in respect to their linkages to other policy topics and forms of meta-talk? Which policy topics or forms of meta-talk are most and least connected to other categories of @message content? How likely does an author of @messages who references a particular policy topic or form of meta-talk also contribute to another manifestation of policy debate or meta-talk?
>
> RQ2.3: How does the TV debate affect the popularity of policy topics within the @message conversations that accompany the media event?

In contrast to contributions about policy issues, which require at least a minimum level of prior political knowledge or interest, meta-talk does not necessitate particular expertise and instead represents the respective @message authors' immediate individual affective reactions to a media event. Regarding RQ2.2, we therefore (1) expect senders of policy-related @messages to generally focus on one particular topic of interest instead of commenting on multiple policy issues, while (2) Twitter users who engage in a 'meta-talk' Twitter conversations are likely to not only utilize one but multiple forms of 'meta-talk' in their @messages. Furthermore, (3) authors of policy-related statements are accordingly expected to

be able to participate in meta-talk debates, but not necessarily vice versa. As these users only focus on one or few particular policy topics, it is likely that their affective perception of both the political and the meta-characteristics of the media event depends on the coverage of the issue which interests them the most. Thus, it can be assumed that (4) some forms of meta-talk are more likely associated with a particular set of policy issues than others.

2.3. Motivation of the Senders of @Messages: Who Receives What Content?

Investigating the content of @messages (RQ2) can help explain the insights about the diverging roles of different user groups in @message discussions (RQ1): An @message sender's decision to direct their Tweet to a particular recipient is most likely determined by the policy or meta-talk content of their Tweet. Investigating the relationship between the different content foci of Twitter users and the group membership of their preferred addressees (i.e., elite or non-elite user) can therefore contribute to a more detailed understanding of different actor groups' role as @message recipients as well as allow for a better comprehension of @message senders' general discourse motivation. Uncovering this motivation helps to assess if Twitter users select the recipients of their discursive efforts more or less randomly:

> RQ3: Is the decision of Twitter users for a recipient of their @message dependent on the content of their contributions?

3. Case, Data and Methods

3.1. Case Selection

We examine our research questions with regard to @message conversations with the hashtags #jeremycorbyn and #corbyn during the *BBC* program "Question Time" on 2nd of June 2017, which was the final appearance of Prime Minister Theresa May (Conservative Party) and her contender Jeremy Corbyn (Labour Party) in the 2017 UK General Election Campaign. By zooming in on the @message conversation between Twitter users commenting on a particular media event in context of a particular election campaign, our study partly diverges from most of previous political Twitter research: Pinpointing one TV debate allows us to limit our investigation to actual 'dual-screening' behavior, which constitutes the most typical form of political Twitter debate and exemplifies the complex interrelationship between virtual discourse and the roles and content of traditional news reporting. Similarly, focusing on @messages concerning one instead of both candidates narrows the overarching discourse space we examine to a degree, which allows us to investigate if users participating in the same discourse actually talk about the same issues.

We chose to focus on Jeremy Corbyn's election campaign for a number of reasons. Firstly, previous research indicates that Twitter discourse plays a particular crucial role for mobilizing supporters in anti-establishment insurgency campaigns (Jungherr, 2015) like Corbyn's. Secondly, by comprising mainly young, urban and political interested voters, which are highly partisan in their political leanings (e.g., Sayers, 2015), Corbyn´s electorate not only reflects the typical characteristics of Twitter users (Jungherr, 2015), but also—by a majority of 57%—utilizes social media as main source of news (Sayers, 2015). Finally, British media's coverage of Jeremy Corbyn is often viewed as particularly divisive (Cammaerts, DeCillia, Magalhães, & Jiménez-Martínez, 2016), which makes the examination of 'dual-screening' behavior (and thus Twitter's potential role as corrective force) particularly relevant.

The program "Question Time" was the only media event in context of the campaign which resembled a traditional TV debate, as Theresa May refused to take part in a head-to-head debate, but agreed to appear directly after Jeremy Corbyn in the respective TV show. The questions were asked as well by the TV audience in York as by the reporters. The TV broadcast touched upon most of the relevant topics of the election campaign and the storylines put forward by the respective campaigns and the mass media.

3.2. Data and Coding

To determine which hashtags are the most valid marker for Twitter debate about Jeremy Corbyn´s campaign, the most mentioned hashtags in the UK were analyzed for consecutive three days in advance of data collection. The raw data was retrieved from Twitter's Streaming Application Programming Interface and coded in a two-step procedure: On the one hand, @message senders and recipients were classified into seven distinct groups (media outlets, individual journalists, parties or party-affiliated organizations, politicians, NGOs, political bloggers and 'average' citizens). On the other hand, the content of the @messages was coded utilizing the discourse network analysis (DNA) approach and software by Leifeld (2017), which allows coding one @message/text portion according to multiple possible categories. Therefore, we can identify multiple different statements in one @message. The respective categories are inductively derived, revised and finally aggregated to higher-level variables that reflect different forms of meta-talk and policy debate.

3.3. Method

In order to investigate our first research question, we model a directed one-mode network whose nodes represent senders or recipients of @messages. The nodes are linked to one another if one user's Tweet (sender) mentions another user's account (recipient)

in their @message. The volumes of received and sent @messages per group are compared by employing descriptive statistics as well as statistical tests to assess the effect of a Twitter user's membership in the coded user groups on the user's indegree and outdegree centrality (i.e., the number of received/sent @messages). For answering our second set of research questions, we utilize descriptive statistics to compare the salience of different manifestations of meta-talk and policy debate as well as the toolset of DNA to identify the overlapping reference to these categories of @message content. To this end, we generate three different one or two-mode concept congruence networks which model the overlapping contributions of @messages authors to the respective forms of content.

Our final research question aims at clarifying the motivation of @message senders by examining if their decision to direct their Tweet to particular recipients is dependent on the policy or meta-talk content of their Tweet. To this end, we created a dataset in which each @message sender constitutes one unit of observation. The first set of variables (i.e., content foci) in this dataset aggregates each users' overall number of statements according to each manifestation of meta-talk or policy debate. Thus, the respective variables capture the number of times that a particular user referred to a particular manifestation of @message content. Similarly, the second set of variables (i.e., choice of recipient) summarizes the number of times each user sent messages to a particular category of recipients. In order to investigate the interrelationship between both sets of variables, we modelled separate regression models for each category of recipients, in which each manifestation of @message content serves as independent variable and the respective group of recipients represents the respective dependent variable (we run the regression with the same independent variables for each dependent variable). In contrast to a regression model, in which each @message serves as unit of observation, the chosen approach ensures the independence of our units of observation and emulates conventional questionnaire-based methods of analysis, which correlate characteristics of users (here: content-related foci) and their action (here: choice of recipient).

Thus, we can not only examine if Twitter users choose the recipients of their discursive efforts randomly or on basis of their @message's content, but also evaluate the significance of differences between the content each user group receives. Due to the distribution and characteristics of our data, we applied negative binomial regression.

The network analysis and all visualizations were conducted using the software Visone (Brandes & Wagner, 2004). All other estimations were conducted in the statistical computing environment R (R Core Team, 2019) using the packages COUNT (Hilbe, 2016) and MASS (Venables & Ripley, 2002) for the regression analysis.

4. Results

4.1. Research Interest 1: Roles in @Message Discourse

To answer our first research question, we disaggregate all 888 @messages with the hashtags #jeremycorbyn or #corbyn, which were posted during the TV debate according to the coded group identity of their authors and recipients (cf. Supplementary File for full results).

This effort shows that elite actors (i.e., politicians, journalists, media venues and parties) hardly engage in conversational @message exchange, while average citizens (751 Tweets by 497 accounts) and bloggers (93 Tweets by 42 accounts) account for the majority of Twitter conversations. However, this relatively large number of @message senders focuses its conversational efforts on a comparatively small set of other users.

Due to the highly skewed distribution of our data, it is problematic to derive a statistical inference through the average-based method. Therefore, instead of using parametric ANOVA and t-test, we utilized a non-parametric Kruskal-Wallis and Wilcoxon-Box test to assess if there is a statistically significant difference in the number of received @messages among members of different user groups (see Supplementary File). While the results of the Kruskal-Wallis test indicate the general presence of significant differences between the groups ($X2 = 49.48$, $p > 0.01$), the Wilcoxon-Box test assesses the probability that the difference between each pair of groups is a product of randomness. Although the latter analysis indicates that elite users are significantly more likely to receive @messages than citizens ($p < 0.01$), they also imply that the likelihood of politician and party-affiliated accounts to be addresses of @message does not significantly differ from the respective likelihood of bloggers ($p > 0.1$), which in turn are also significantly more likely to receive @messages than citizens ($p < 0.01$) . Therefore—in regard to our first research question—we can only partially confirm the results of previous research: On the one hand, the investigated @message discourse is almost exclusively ascribable to the conversational activity of bloggers and citizens rather than elite users, while the latter are indeed more likely recipients of these efforts than citizen users. On the other hand, bloggers are not necessarily less likely to receive @messages than some elite groups, which underlines their role as intermediary users between political elites and the 'Twitter population.'

4.2. Research Interest 2: Content of @Message Discourse

In summary, the content of the 888 examined @messages amounts to 1.406 statements, of which 504 (33.7%) cover policy issues, while 992 (66.3%, sent by 485 users) contribute to the meta-talk about the media setting and the appearance of politicians.

4.2.1. Meta-Talk

Regarding the popularity of different meta-talk concepts in @message conversations, Table 1 disaggregates the latter 992 statements according to the different types of meta-talk. This provides more detailed insights into the particular forms of meta-talk and their respective prominence within the conversational Tweets of bloggers and citizens: In line with previous research (Kalsnes et al., 2014), this analysis identifies Twitter users' personal evaluation of the TV appearance of politicians as the most dominant form of meta-talk (432 statements by 226 users). However—in contrast to the expectations of previous studies—Twitter users more visibly evaluate the professional competency of the contestants (251 statements by 178 users) than they discuss the tone and style of their appearance (181 statements by 147 users).

The second most referred overarching category of meta-talk ('general comments') subsumes multiple different types of commentary which share a more or less distinct detachment from the TV debate's immediate context. The most dominant manifestation of this type of meta-talk (partisan statements) underlines the high degree of polarization in Twitter discourse (Jungherr, 2015): The relative balance between satirical or personal anecdotes and fact checking indicates that Twitter conversations equally constitute an arena for serious policy debates and a 'virtual fireside' for more trivial chats. The comparatively low amount of general 'anti-establishment' statements could partly result from Jeremy Corbyn's image as 'anti-establishment candidate,' because of which users refrain from general criticism and instead take sides with the non-mainstream contestant. The third most popular type of meta-talk is idiosyncratic for dual-screening as it embeds the virtual evaluation of the TV debate in other simultaneously occurring 'old' or 'new' media discourses by linking the Twitter debate either to the TV debate itself or to other second-screen media venues. By criticizing the latter's content, the largest number of venue-linking statements expands the meta-debate about the immediate TV show to an even larger debate about the 'new' and 'old' media setting of the election campaign in general ('meta-meta-debate'). This observation is particularly noteworthy because the evaluation of the TV debate's immediate setting is the least prominent form of meta-talk. Unsurprisingly, only a marginal number of users praises the moderators, audience or the format of the show (14 statements by 12 users), while the majority of conversational contributions criticizes the media event's setting (132 statements by 86 users). This underlines the predominantly negative tone of Twitter content in general (Jungherr, 2015).

Regarding network structure of meta-talk in @message conversations, our research approach not only aims at uncovering the diverging salience of different (inductively derived) types of meta-talk (RQ 2.1), but also at assessing the structural precondition for the development of shared beliefs, integrated discourse strategy and discourse coalitions, i.e., if and how users simultaneously refer to multiple manifestations of meta-talk (RQ 2.2). While the user counts in Table 1 indicate that the majority of users within the meta-talk discourse indeed refer to more than one particular form of meta-talk, we switch to a network perspective in order to draw a more comprehensive picture of the integration of different meta-talk manifestations. To this end, Figure 1 visualizes the concept-congruence network of the respective Twitter debate. This network's nodes represent the different types of meta-talk and are linked if a user simultaneously utilizes two concepts (with the size of the edges indicating the respective number of users).

In general, the presented network indicates that meta-talk contributions of @message authors result in an integrated, comprehensive and densely connected debate structure, as all nodes are at least indirectly connected to each other and each node is connected to at least two nodes of a different type of meta-talk (cf. node

Table 1. Number of statements and users for each meta-talk concept.

Topic (statements/users)	Meta-talk concept (statements/users)
Evaluation of TV debate media setting (146/96)	Praise for media setting (14/12) Criticism of media setting (132/86)
Linking TV debate to other venues (158/118)	Link/General reference to TV debate (26/22) Link/General reference to other second screen medium (54/39) Criticism of other second screen mediums (78/64)
Evaluation of politicians (432/226)	Evaluation of politicians' style and tone (181/147) Evaluation of politicians' competency (251/178)
General comments (259/179)	Fact checking (69/52) General partisan statements (103/83) Satire and personal anecdotes (55/45) General anti-establishment statements (32/24)

Notes: The first count indicates the number of statements identified for each type or manifestation of meta-talk, while the second count indicates the number of users contributing to the respective concept or topic.

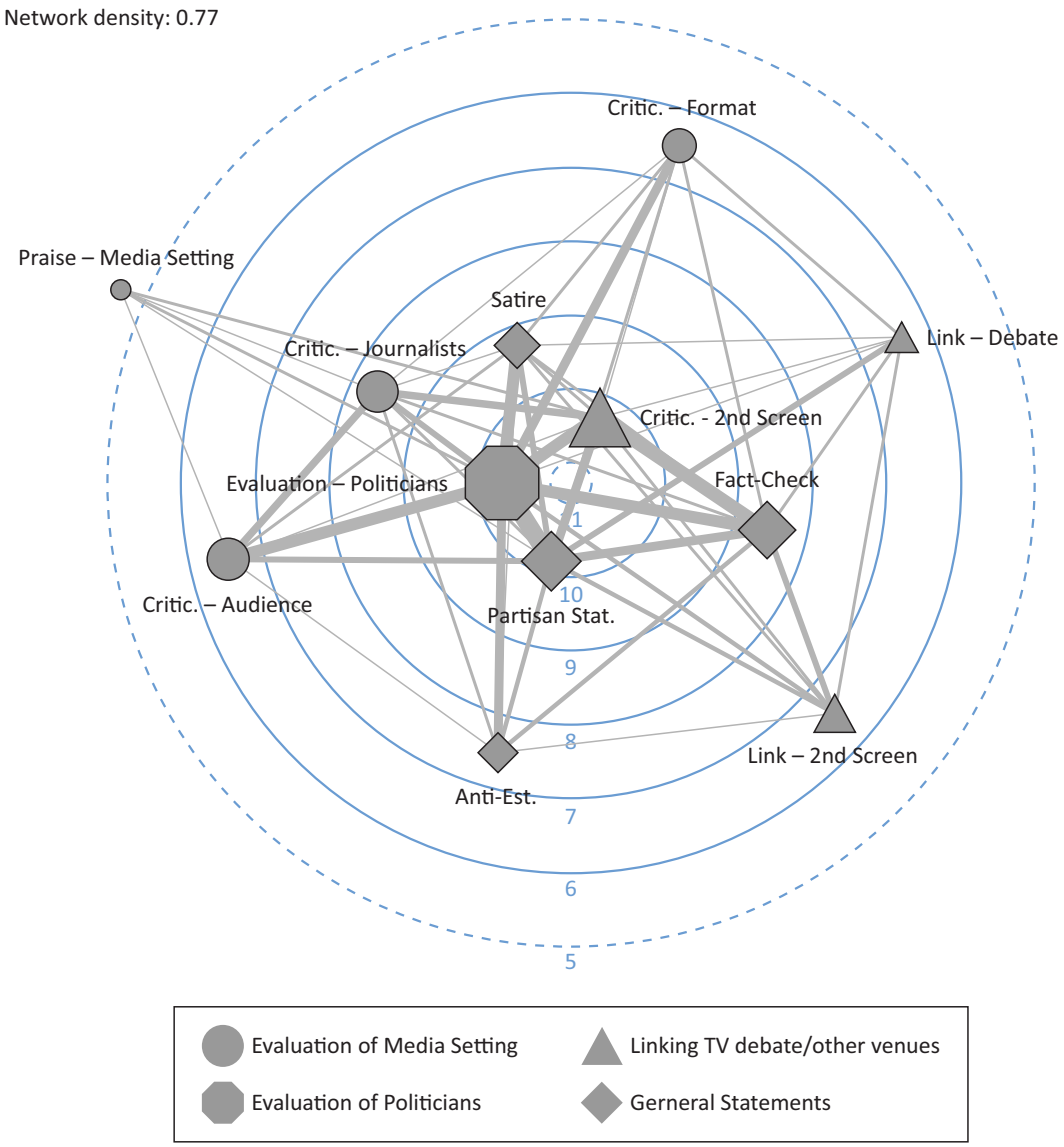

Figure 1. One-mode discourse network of meta-talk conversations. Notes: The edge width visualizes the number of @message senders which refer to both categories of content. The position of a node in the radial layout indicates number of other manifestations of content referred to by users contributing to the respective concept. The node size visualizes the overall number of users referring to at least one other than the respective concepts. The node shapes are as follows: Circles denote meta-talk evaluating the media setting of the debate; octagons denote meta-talk evaluating the debate performance of politicians; triangles denote 'venue-linking' meta-talk; diamonds denote general meta-talk comments; squares denote manifestations of policy debate.

type, caption of Figure 1). Accordingly, Twitter users who use one type of meta-talk are also likely to engage in other forms of meta-talk.

The network's three core nodes—'partisan statements,' 'criticism of second-screen media' and 'evaluation of politicians appearance'—are linked to all 11 other concepts of the network and reflect three of the four overarching types of meta-talk (cf. node types). Thus, they additionally accentuate the network's embeddedness: By taking side with one politician, evaluating her or his opponent's performance and/or scrutinizing the content of second-screen media, @message senders generate an overarching frame of reference which allows to posit, compare and link their other meta-talk contributions. The strong linkage of these nodes themselves suggests that Twitter users either base their assessment of second-screen media on the perception of the politicians' performance or vice versa, while both are either derived from or significantly influence their respective partisan support.

The equally weak linkage of references to the TV debate and references to second-screen media partly uncovers the dynamics of @message conversations: There is obviously only a small set of users who initially reference other second-screen venues in context of a limited amount of meta-talk issues. However—as the central

position of second-screen criticism underlines—a larger number of users picks up these links during the course of the debate and transcends their scope by scrutinizing their content concerning a broader set of concepts.

Regarding general statements, both 'satire' and 'fact-checking' are in a clear proximity to the network core. The former's linkage to nearly all (except one) other concepts underlines the crucial role of satire for all types of (meta)discourse on Twitter, while the latter's strong connection to the three cores nodes indicates its relevance as an instrument for increasing the persuasiveness of Twitter users' general convictions or their judgements about politicians and second-screen media reports.

4.2.2. Policy Debate

Regarding the popularity of different policy issues in @message conversations, Table 2 disaggregates the 504 policy-related statements and their 245 authors according to 10 inductively coded concepts. This overview indicates that security (predominantly Corbyn's position on nuclear weapons) is the by far most prominent topic in the @message conversations, followed by the discussion of historical political events (mostly the Irish peace process), economic policies (mostly austerity policy and the cost of Labour's election pledges) and questions of political strategy (mainly May's decision for a 'snap election'). Although all topics of the TV debate are represented in the Twitter discourse, the varying degree of attention to specific issues illustrates that Twitter discourse does not necessarily just reflect the agenda setting of traditional media venues. On the contrary, 'traditional' domestic sociopolitical policy issues like the changes in society and social discourse, the labor market, health and education and migration received much less attention in the @messages of Twitter users than in the TV debate. This finding is particularly remarkable as it contradicts the assumption of previous literature that Twitter users are more likely to comment on topics or events which affect them personally than on abstract geopolitical or power-related issues. With respect to the specific circumstances of the 2017 UK General Election, it is at least surprising that the discussants' position on Brexit and the EU played only a minor role in the @message debate.

Regarding the effect of media event on policy debate in @message conversations, in order to assess if the respective issues' salience is a direct reaction to the established media's coverage or if it follows a partially diverging logic (RQ 2.3), Figure 2 visualizes the distribution of @message statements per topic over time (in 10 minute frequencies) during, shortly before and after the TV show (20:20–21:30), and produces three key insights: Firstly, the four most prominent issues (history, security, economy, and political strategy) already represented the largest share of the online debate before the TV program started. In all the cases, the TV debate's start leads to a temporary decline in topic-specific attention, which is overcome as soon as the topic is picked up in the program and fades after the end of the TV show. Secondly, the overall less prominent 'traditional' sociopolitical policy topics (labor market, migration, health and education, society) were scarcely debated before the TV debate's start, which temporarily called attention to these issues, but vanished after the end of the debate. Thirdly, Brexit was one of the most discussed issues before the TV debate, which surprisingly shifted attention away from the topic, change still observable after the debate. Thus, in respect to most topics, media events like TV debates only have a limited and temporary influence on the logic of agenda setting on Twitter, while in some (exceptional) cases like the Brexit debate the 'elite' media environment is indeed able to generate sustainable shifts of the @message agenda.

Regarding network structure of policy debate in @message conversations, similar to Figure 1, Figure 3 depicts the discourse network emerging from the simultaneous reference of @message senders to multiple policy issues in order to assess the integration of policy debate and the potential for coalition building (RQ 2.2). In contrast to the meta-talk network, the policy debate does not produce an integrated network, as the node 'environment' is isolated from the rest of the nodes. This indicates that the four users discussing environmental policies do not refer to any other policy issues. However, the other nodes of the discourse network are not only as integrated as the meta-talk concepts, but also more densely connected with each other. When ignoring the unconnected debate about environmental policies, 89% of all

Table 2. Number of statements per policy issue.

Policy issue	Number of statements (users)
Security	174 (115)
Economy	77 (45)
Historical political events	77 (34)
Political strategy	58 (39)
EU-membership of the UK/Brexit	41 (29)
Society	31 (20)
Labor market	17 (12)
Health/Education	14 (12)
Immigration	10 (6)
Environmental policy	5 (4)

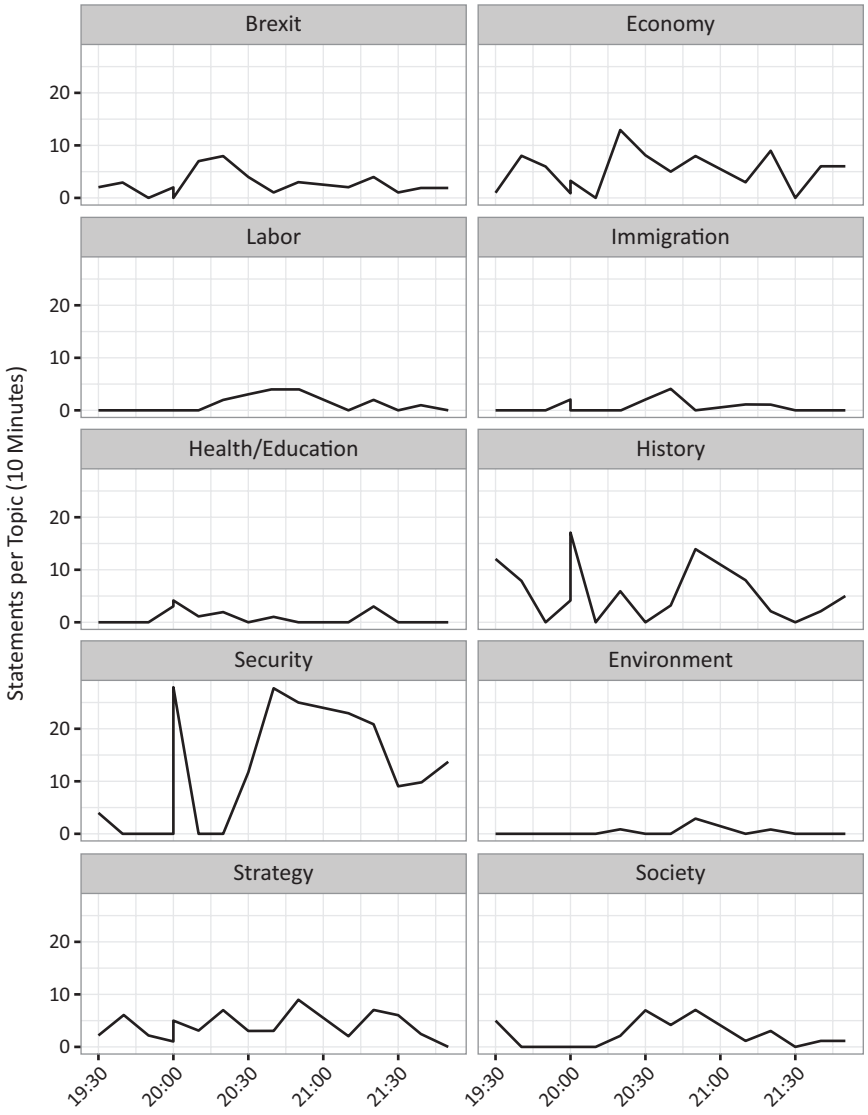

Figure 2. Volume of policy issue statements over time during TV debate. Notes: Each time series graph visualizes the course of the number of statements associated with each policy topic in 10-minute intervals during, shortly before and after the TV show (20:20–21:30).

potential connections within the network are covered by the actual observable linkages between the policy issues. This implies that @message authors relate policy issues more immediately with each other than they link different forms of meta-talk.

In contrast to the meta-talk network, the prominent position of the policy debates' core nodes does not necessarily reflect their overall popularity with @message authors (cf. Table 2): Although security issues are more often discussed (115) than economic policies (45), both concepts are linked to the same number of other statements. Furthermore, the unanticipated secondary role of Brexit and society in respect to the overall distribution of users' attention is contrasted by their central position in the discourse network. Thus, although being an overall less popular matter of debate, both topics constitute important reference points through which some users locate and interpret all other political concepts.

If we consider the strength of the lines between the most dominant issues (security, economy, history, strategy and Brexit), the previously discussed bifurcation of the discourse is visible. The dominant issues are more strongly connected to each other than to sociopolitical issues, while the latter are more evenly linked to (nearly) all of the remaining policy discussions. Thus, the domination of (historical) foreign policy-related, economical or strategical issues is also represented in the relational expression of the conversational efforts of @message authors.

4.2.3. Links between Meta-Talk and Policy Debates

For a comprehensive assessment of discourse integration and coalition potential, the previous isolated relational analyses of meta-talk (cf. Figure 1) and policy debate (cf. Figure 3) must be complemented by an examina-

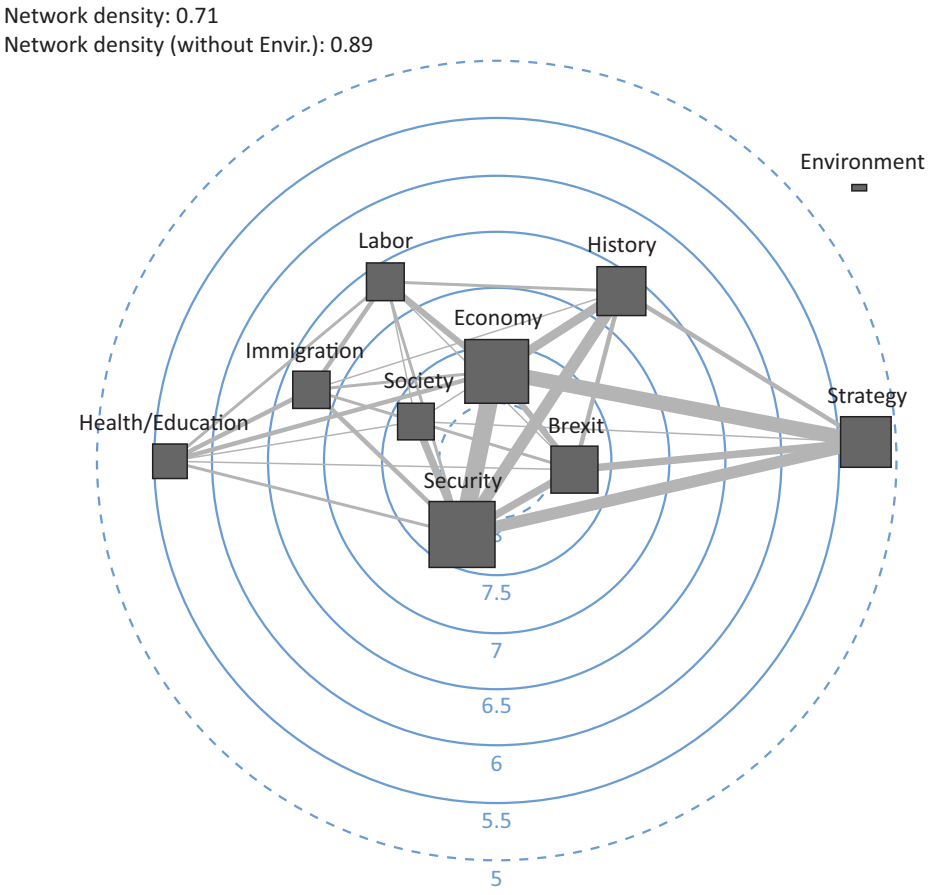

Figure 3. One-mode discourse network of policy debate. The edge width visualizes the number of @message senders which refer to both categories of content. The position of a node in the radial layout indicates number of other manifestations of content referred to by users contributing to the respective concept. The node size visualizes the overall number of users referring to at least one other than the respective concepts. Squares denote manifestations of policy debate.

tion of links between the manifestations of both types of @message content. To this end, Figure 4 visualizes a two-mode discourse network, in which an edge between two nodes is only modelled if a user simultaneously refers to a policy (dark grey nodes) and a meta-talk concept (light grey nodes).

The network's overall integrated structure indicates that each policy issue is associated with a number of particular meta-talk issues and vice versa. Thus, it can be concluded that both forms of content are embedded in an overarching integrated debate context. As the size of the policy-related nodes equal the respective node size in Figure 3, all of the users discussing a policy issue also refer to at least one meta-talk concept. The same is not true for the authors of meta-talk @messages, as the size of the meta-talk nodes in the two-mode network is smaller than in Figure 1. This validates that contributing meta-talk @messages require less political expertise and interest than the participation in policy debates, which is why authors of policy-related messages are also likely to discuss meta-talk concepts but not vice versa. In this context, the discursive embeddedness of environmental policies is particularly noteworthy: Albeit users discussing this topic do not refer to any other policy issue (cf. Figure 2), they participate in the debate on some meta-talk concepts. Accordingly, meta-talk serves as a point of connection for indirectly linking the otherwise isolated sub-discussion to the larger context and the deliberation of other policy issues. As all nodes differ concerning their position, size and the strength of their linkage to other concepts, it can be concluded that some policy issues are indeed more likely associated with particular forms of meta-talk (for a more detailed analysis, cf. Supplementary File).

4.3. Research Interest 3: Motivation of @Message Senders

Our final research question aims at examining if the decision of Twitter users for a recipient of his @message is dependent on the content of their contributions. To this end, we run six separate negative binomial regression models for each category of recipients, in which each manifestation of @message content serves as independent variable and the respective group of recipients represents the respective dependent variable (see Section 3 for details and Supplementary File for the results). For a comprehensive interpretation, we summarized the re-

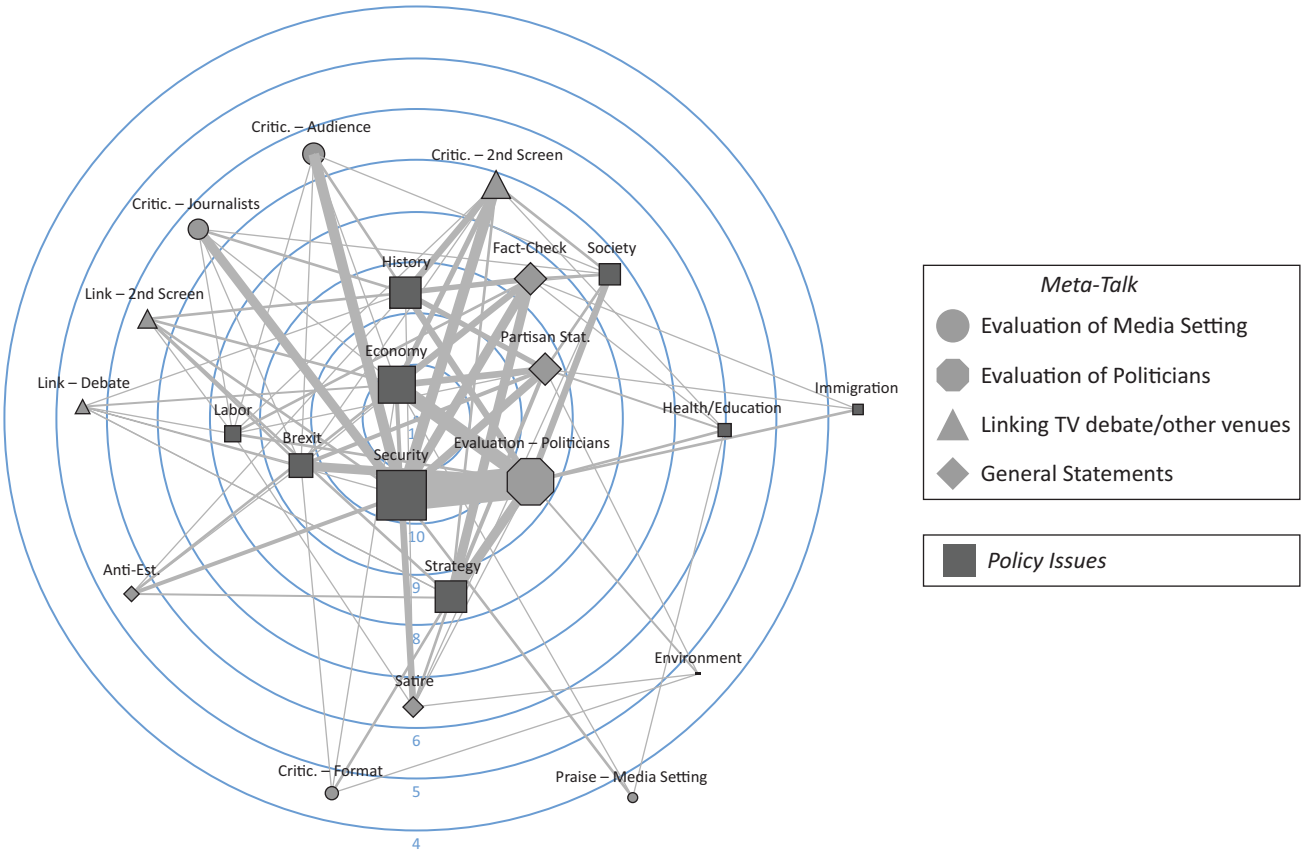

Figure 4. Two-mode discourse network of policy-debate and meta-talk in @message conversations. Notes: The edge width visualizes the number of @message senders which refer to both categories of content. The position of a node in the radial layout indicates the number of other manifestations of the other category of content mentioned by the respective authors. The node size visualizes the overall number of users referring to at least one concept of the respectively other category. The node shapes are as follows: Circles denote meta-talk evaluating the media setting of the debate; octagons denote meta-talk evaluating the debate performance of politicians; triangles denote 'venue-linking' meta-talk; diamonds denote general meta-talk comments; squares denote policy issues.

sults of all regression models in Figure 5. The light grey (meta-talk issues) and dark grey (policy issues) nodes represent independent variables with significant effects in at least one of the regression models—i.e., manifestations of @message content which increase a user's likelihood to choose a particular recipient for their @message. Black circular nodes depict @message recipients (i.e., dependent variables), whose likelihood to be addressed is significantly associated with users' content foci.

In general, this visualization confirms the effect of @message content on the decision of @message senders for the respective Tweet's recipient: The mere presence of edges indicates that some categories of recipients are indeed more likely to be addressed by another user, if this user has more interest in particular policy issues or distinct forms of meta-talk. Therefore, it can be concluded that Twitter users' decision for a recipient of their @message is indeed partially dependent on their contribution's content. The presented network's structure underlines this finding, as the majority of topics is only connected to one category of @message recipients and only one topic ('criticism of journalists') links more than two user groups. However, some concepts (society, links to the debate, health and education) are not at all associated with users' decision to address particular user groups.

More particularly, policy issues (black squares) seem to play only a negligible role in explaining Twitter users' decision to address elite users. Remarkably, the likelihood of @message senders to address politicians and journalists is not dependent on any emphasis on a specific political issue, while parties are only associated with one form of political content and the linkage of media venues to three policy topics is only weakly significant. In contrast to this, non-elite actors like bloggers and citizens are very likely to be contacted by users with clearly delineated political foci. Furthermore (with the exception of political strategy), the preferred policy topics of users who contact citizens and the policy emphasis of users who address bloggers are non-overlapping. This means that Twitter users consciously distinguish between non-elite 'citizen' users and semi-elite bloggers (cf. Section 4.1) as suitable recipients for the respective topics: A user who contacts 'citizens' is more likely to

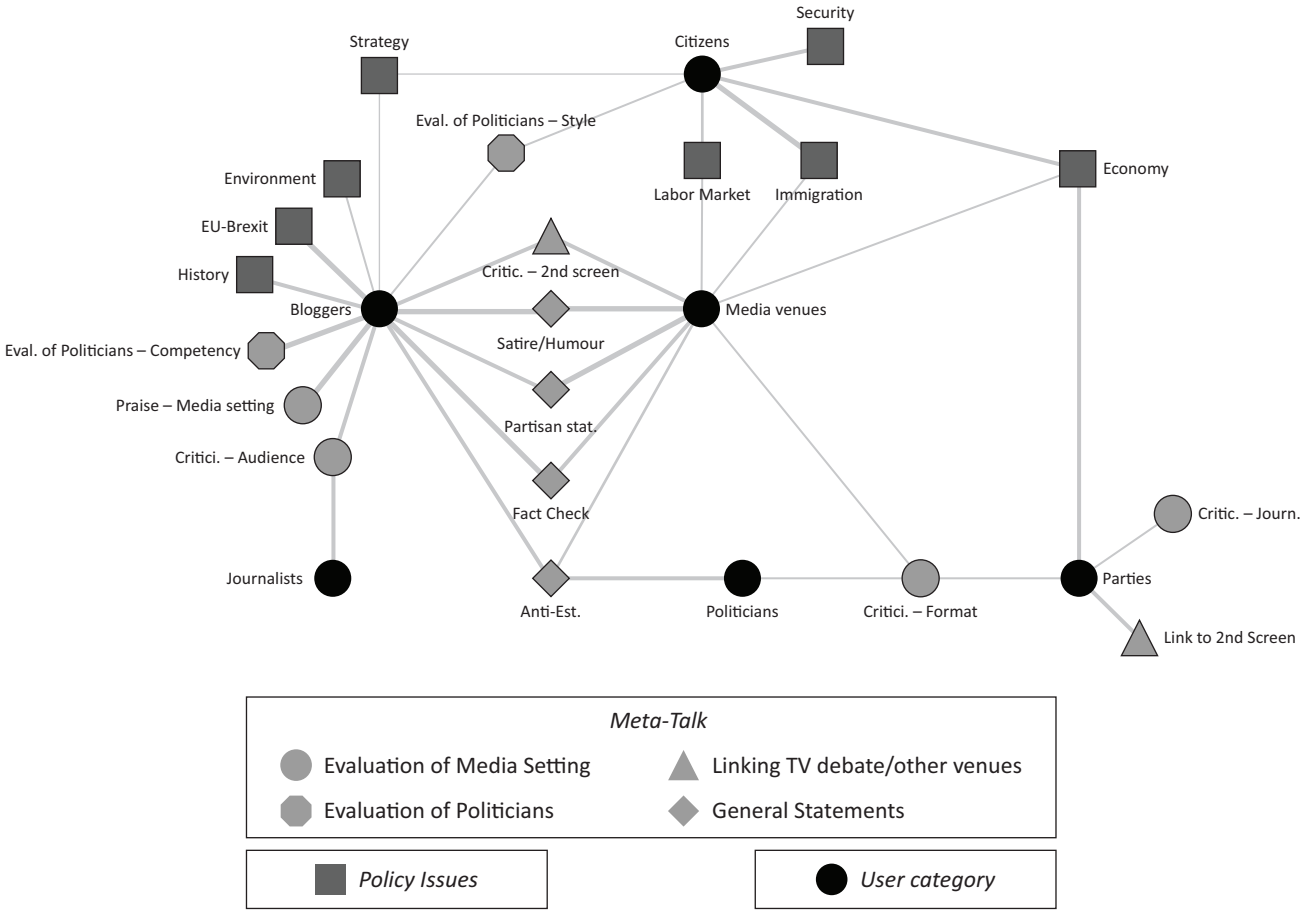

Figure 5. Significant results of negative binominal regression analysis. Notes: The dependent variable is the user category of @message recipients (black nodes); the independent variable is the type of content (grey nodes, node shapes and shades as in Figure 1). The edge width visualizes the level of significance ($p < 0.001$, $p < 0.01$, $p < 0.05$). Only significant coefficients were mapped as nodes.

contribute to 'standard' political topics like the economy, immigration, political strategy and security, while a user who confronts political bloggers is more likely to prefer conversations about context and election-specific issues like the Brexit debate and Jeremy Corbyn's role in the Irish peace process.

The role of @messages that evaluate the appearance of politicians in the debate mirrors this relationship: On the one hand, none of the elite recipients are associated with a particularly high likelihood to receive such @messages, while both bloggers and citizens are likely to receive Tweets by users that emphasize the tone and style of the politicians' appearance. On the other hand, users who confront bloggers also emphasize the competency of the debates' contestants, while users who address citizens do not show a particular preference for that topic. This confirms our previous observation that @message senders consciously distinguish between citizens and bloggers. In a similar vein, citizens are not associated with any form of meta-talk that evaluates the media setting.

Regarding the role of criticism of second screen media as well as fact-checking, satirical, partisan or anti-establishment statements (i.e., 'general statements,' light-grey octagons), bloggers and media venues are structurally equivalent, as both groups are very likely to receive @messages by users who put an emphasis on this form of debate contribution. In contrast to this, politicians, parties and journalists are linked to a maximum of three particular manifestations of content, as most of the respective regressions' explanatory variables were insignificant in our models. This means users who address these elite recipients seem to have less clearly delineated areas of focus, as most forms of content are associated with the same (and accordingly insignificant) likelihood to be directed at the respective user group. Despite profiting from a comparable or even larger amount of conversational attention as bloggers (cf. Section 4.1), elite users therefore receive less targeted @messages as well as @messages that are less distinguishable in terms of their content. This difference could result from the realization of @message senders that elite actors use the @message functionality only reluctantly (cf. Section 4.1). Therefore, users who have a more targeted area of interest and aim at starting a conversation direct their messages at bloggers who combine the more proactive

Twitter behavior typical for 'citizens' and the more central position in the Twitter attention network typical for elite users (cf. Section 4.1). As receiving more focused @messages also enhances the ability of bloggers to respond to the respective Tweets, these insights underline the crucial role of bloggers as challengers of the agenda-setting powers of political and media elites.

5. Discussion and Conclusion

From a theoretical perspective, the main aim of our study is to provide a starting-point for investigating the presence of discursive coalition-forming and framing processes in 'dual-screening' virtual discourse. As political research in the field of social media has not yet developed its own theory (e.g., Jungherr, Schoen, Posegga, & Jürgens, 2017), we base our effort on the discourse-coalition concept put forward by Maarten Hajer (1993) and examine the preconditions for the actual formation of shared beliefs and discourse coalitions in Twitter conversations. While most previous studies utilizing digital trace data quantitatively interpret the salience of different hashtags, keywords or users as indicators for the formation and sharing of opinions, we take a step back and examine if the actual content and patterns of Twitter users' interactions allows for this kind of interpretation. Thus, we can judge whether Twitter conversation generally allows users to form strategically successful discourse coalitions that are delimited by certain topics.

To this end, we first compare the different roles of political or media elites and non-elite Twitter users in @message conversations: In line with previous findings, we confirm elite users' lower likelihood to send @messages in comparison with citizens and bloggers and their higher likelihood to be addressees of conversational attention in comparison with citizens. However, we do not find differences in elite users' and political bloggers' likelihood to receive @messages. This underlines the role of bloggers as intermediaries between conversational unengaged, but heavily contacted political elites and the general 'Twitter population' that actively participates in conversations but is only seldomly contacted. In other words, bloggers are crucial actors for forming and maintaining discourse coalitions relying on Twitter exchange and should therefore receive particular consideration in future more comprehensive research efforts.

Secondly, as one of the as of yet first systematic and comprehensive analysis of @message content during media events, this study embeds previous studies' (e.g., Kalsnes et al., 2014) rather exploratory investigations of the content of Tweets into a more differentiated perspective that uncovers the relational structures resulting from Twitter users' simultaneous reference to multiple forms of meta-talk or multiple policy issues. Utilizing the toolset of DNA, we could substantiate not only that Twitter users involved in a particular discourse actually talk about the same topics and integrate multiple issues into an overarching 'meta-talk' and policy discourse, but also illustrate that some @message content is more likely related to other forms of meta-talk or policy issues than other manifestations of content. As this diverging degree of connectedness did not necessarily mirror the respective concepts' salience, future studies should address this issue in a more detailed manner—particularly with regard to the role of core frames and consistent storylines for the success of discourse coalitions (cf. Section 1).

Finally, we provide a first explanation for the varying distribution of @message attention between elite and non-elite users as we uncover that the decision of @message authors for a recipient of their @message is not random, but dependent on the content of their Tweet. This demonstrates that Twitter users do not talk to the 'void,' but are generally able to consciously or unconsciously address particular users in regard to particular questions and could therefore indeed form discourse coalitions. Regarding the applicability of Hajer's discourse coalitions theory to Twitter conversations, these findings point to two main implications. On the one hand, our results show that @message discourse fulfills crucial preconditions for the actual occurrence of political discourse and the formation of discourse coalitions in Twitter conversations: Twitter users should not only be able to develop shared beliefs and storylines, as their @messages simultaneously refer to and integrate multiple manifestations of content, but could also form discourse coalitions, as they choose the addressees of their Tweets strategically. On the other hand, the crucial position of bloggers (cf. Sections 4.1 and 4.3) as well as the difference between the agenda of the media event and the Twitter conversation accompanying it (cf. Section 4.2.2) shows that Twitter discourse follows a partially different logic than traditional discourse arenas: The interaction and mutual influence of political and (broadcasting top–down) media elites (Hajer, 2009) is increasingly challenged by competing agenda-setters like bloggers, which therefore deserve more academic attention.

From a methodological point of view, the present article's main and as of yet unique contribution to previous political research on social media consists in employing DNA and thereby supplementing this work's quantitative insights by a qualitative standpoint. This change of perspective not only embodies a significant divergence from previous—predominantly quantitatively oriented—political Twitter research, but also constitutes a promising opportunity to directly address the former's central analytical gaps, as the broad methodological toolset provided by DNA combines the advantages of both qualitative and quantitative methods. Thus, this article should only represent the starting point for applying DNA to political Twitter research—particularly because the exploratory nature of this article entails two severe limitations: On the one hand, our approach differs from most applications of DNA by not identifying and comparing actual shared beliefs and the resulting different discourse coalitions or their respective interrelationships. Instead, we employed DNA to substantiate the precondi-

tions for discourse coalition formation in Twitter conversation. Considering the success of this approach, we recommend future research to employ a more traditional DNA-approach and investigate the actual presence of shared perceptions and discourse coalitions in virtual debate. On the other hand, we draw on previous studies in the field of political Twitter research by consciously zooming in on the @message conversation between Twitter users commenting on a particular media event in context of a particular election campaign. Future studies should examine the validity of our insights in more comparative research settings.

Acknowledgments

We want to thank Keiichi Satoh, the Academic Editor and three anonymous reviewers whose constructive comments have greatly improved the article.

Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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Politics and Governance (ISSN: 2183–2463)
2020, Volume 8, Issue 2, Pages 326–339
DOI: 10.17645/pag.v8i2.2591

Article

Integrating Manual and Automatic Annotation for the Creation of Discourse Network Data Sets

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Submitted: 30 October 2019 | Accepted: 23 March 2020 | Published: 2 June 2020

Abstract
This article investigates the integration of machine learning in the political claim annotation workflow with the goal to partially automate the annotation and analysis of large text corpora. It introduces the MARDY annotation environment and presents results from an experiment in which the annotation quality of annotators with and without machine learning based annotation support is compared. The design and setting aim to measure and evaluate: a) annotation speed; b) annotation quality; and c) applicability to the use case of discourse network generation. While the results indicate only slight increases in terms of annotation speed, the authors find a moderate boost in annotation quality. Additionally, with the help of manual annotation of the actors and filtering out of the false positives, the machine learning based annotation suggestions allow the authors to fully recover the core network of the discourse as extracted from the articles annotated during the experiment. This is due to the redundancy which is naturally present in the annotated texts. Thus, assuming a research focus not on the complete network but the network core, an AI-based annotation can provide reliable information about discourse networks with much less human intervention than compared to the traditional manual approach.

Keywords
annotation; automation; discourse networks; machine learning; migration discourse

Issue
This article is part of the issue "Policy Debates and Discourse Network Analysis" edited by Philip Leifeld (University of Essex, UK).

1. Introduction

Discourse network analysis (DNA) offers a conceptual framework for the analysis of discourse structures and dynamics. Numerous DNA studies have shown that the network perspective on political discourse offers insights that go beyond traditional policy analyses and qualitative discourse studies (Haunss, 2017; Leifeld, 2016; Nagel & Satoh, 2019; Wang & Wang, 2017). In principle, modelling the development of political debates as dynamic discourse networks may enable us to identify recurring mechanisms that drive the development of political debates and to distinguish between network effects and actor attribute effects. Unfortunately, the creation of dynamic discourse network data sets is extremely time- and labour-intensive and therefore poses a serious barrier for this kind of analysis.

In this article, we present the first results from a research project in which we investigate annotation workflows that integrate machine learning to partially auto-

mate and thus significantly speed up the annotation of large text corpora. The article addresses two closely related research questions: First, it asks to what extent the integration of machine learning tools can enhance annotation by human annotators in terms of annotation speed and annotation quality; second, it evaluates the quality of the discourse network representation of the machine learning based annotations. This allows us to fully assess the potential of our (semi-)automatic methodology.

Regarding the first question, we present results from an annotation experiment that, indeed, show overall gains in terms of annotation speed, and a moderate increase in annotation quality with the assistance of machine learning based predictions. Additionally, given the increase in annotation quality, the approach might help to reduce bias in the generation and analysis of discourse networks by increasing the number of claims found, which otherwise would not have been identified by the human annotators.

Regarding the second question, we compare the discourse networks that would result from the annotations of a machine learning based automatic pseudo-annotator, and where human coders would only eliminate false positives, with those discourse networks resulting from our manual annotation. In this setting, our system performs surprisingly well, and we can show that it is possible to reproduce the core discourse network with only minimal manual intervention. While these findings are still preliminary and abstract from still open tasks of reliable automatic speaker identification and fine-grained claim classification, they open up new opportunities for semi-automatic annotations of large text corpora.

We first present our modelling approach and discuss our strategy to integrate machine learning for claim identification and claim categorisation. In the second part of the article, we report results from an experiment in which the annotation quality of annotators with and without machine learning based annotation support is compared. Finally, we discuss the potential for a more automated annotation model by evaluating the experimental data with discourse networks.

2. Existing Approaches to Analyse the Content of Large Text Corpora in the Social Sciences

In the social sciences and humanities, analysis of text corpora typically distinguishes between qualitative and quantitative approaches, or a mixture of both (Kelle, 2008; Kuckartz, 2014). However, when dealing with large text corpora, text analysis is always quantitative because it bases its argumentation necessarily on some form of numeric evaluation of the text data. The main difference between the various approaches is whether they rely mainly on statistical evaluation of the raw textual data or whether they include some form of content-based abstraction from the original text.

The first group of these approaches comprises text mining (TM) techniques that rely on word frequency, co-occurrence analysis, or on the analysis of the distribution of syntactic patterns at the text surface (which serve as an indication for underlying information, e.g., social group membership). From this perspective, texts are viewed as sets of such surface cues, and TM tries to directly draw conclusions from the statistical distribution of these cues (Wiedemann, 2016, p. 40). This opens the possibility to quickly analyse large corpora, which cannot be researched manually in a reasonable timeframe. Studies in this vein have been able to automatically identify actors' policy positions on a political left–right scale (Laver, Benoit, & Garry, 2003) or support vs. opposition to legislative proposals (Klüver, 2009). They can identify topics in political debates and explore the structure in which these topics are related (Walter & Ophir, 2019), and analyse the tone of political debates using sentiment analysis (Burscher, Vliegenthart, & de Vreese, 2016). Recent work combines machine learning with more traditional statistical approaches (for an overview see Welbers, van Atteveldt, & Benoit, 2017; for a discussion see Wilkerson & Casas, 2017).

The second group of approaches tries to capture complex meaning structures on a more fine-grained level. They usually rely on more or less extensive annotation of the raw text material by human annotators, following a codebook that provides categories at a certain level of abstraction from the original text in order to identify political claims (Koopmans & Statham, 2010), frames (D'Angelo & Kuypers, 2010), or evaluative statements (Schmidtke & Nullmeier, 2011). Although manual text annotation offers very precise results, it is extremely expensive. Quantitative annotation-based text analysis therefore usually tries to scale up a reduced set of techniques from qualitative text analysis, notably the assignment of abstract categories to text segments.

Various combinations of TM and annotation approaches have been suggested, where TM is used to structure the corpus and to answer more general research questions, and where only a limited sub-set of texts is then manually annotated, effectively reducing the amount of annotated text (Stulpe & Lemke, 2016). The methodological approach we present in this article follows a different logic. It places considerable emphasis on careful manual annotation (and codebook development) but takes advantage of recent machine learning techniques. Only a comparatively small set of text data is initially manually annotated without machine learning support, and this is then used as training data for classifiers that can expand the scope of analysis to considerably larger corpora. Instead of limiting the amount of annotated text, we aim at annotating the complete corpus but limiting the amount of manual annotation without machine learning support. The limited precision and recall of machine-learned classifiers can be counteracted in a 'mixed methods' approach: Where precision is important, automatic predictions are not used to replace manual annotation decisions, but to speed up the process. Where the corpus includes enough redundancy, ag-

gregation over automatic predictions can make up for recall issues.

3. MARDY: The Task, the Challenges and the Annotation Environment

The MARDY (Modeling ARgumentation DYnamics in political discourse) annotation environment enables parallel multi-user annotation of texts and the integration of machine learning based annotation (the software components of the MARDY environment are listed in Appendix 1 in the Supplementary File; for a detailed description see Blessing et al., 2019). In the specific study presented here, we use it to annotate political claims in newspaper articles in the German daily quality newspaper *taz—die tageszeitung*. Drawing on Koopmans and Statham (2010, p. 55), we define a claim as a purposeful communicative action in the public sphere by which an actor tries to influence a specific policy or political debate. A claim can be a verbal statement or another form of action like a protest or a political decision that articulates political demands, calls to action, proposals, or criticisms.

Manual claim annotation involves multiple steps. Claims need to be identified in the text, a speaker/actor needs to be identified and assigned to the claim, and the identified claim needs to be assigned a category, a polarity (support or opposition) and a date (by default the day before the publication of the article). With MARDY we ask two questions: (a) What would this process look like if we could automate it completely?; and (b) how can we digitally support manual annotation?

The answer to (a) is shown in the left-hand panel of Figure 1. The annotation steps can be mapped fairly directly to tasks that a completely automatic discourse network extraction system would have to carry out. Arguably, an automatic system should not have to predict the date; meanwhile, it makes sense to include the aggregation step (moving from individual annotations to a network) into its purview.

With regard to (b), a computer-supported annotation environment can help the annotation process on four levels: 1) speed up the manual annotation process; 2) support the conceptual side of the annotation process; 3) improve annotation quality and consistency; and 4) (partially) automate the annotation process by integrating machine learning for claim detection and classification. We will now give short sketches of the first three points and then discuss how the MARDY annotation environment integrates machine learning in more detail (links to a demo version of the annotation environment and to the documentation and code are listed at the end of this article in Section 7).

The MARDY environment has the following goals:

Goal 1 (*speeding up the annotation*): To prevent the annotators from reading large amounts of irrelevant texts, MARDY performs document selection as a preprocessing step: By integrating a keyword and a document classification approach, MARDY shows to the annotators only documents that discuss the topic relevant for the annotation (i.e., in this article, immigration) and are therefore likely to contain claims. Thus, preprocessing speeds up the claim detection task effectively. Actor detection is also supported with pre-processing, as textual strings denoting potential actors are identified by employing automatic tools for named-entity recognition, stored in an updatable knowledge base, which was initialised by data records from Wikidata (Vrandečić & Krötzsch, 2014) and suggested to the annotator in the user interface.

Goal 2 (*conceptual annotation support*): In the lifecycle of an annotation project, annotators learn from the feedback of experts, and experts need to modify the initial classification scheme (the codebook) based on feedback from the annotators. MARDY supports both sides of

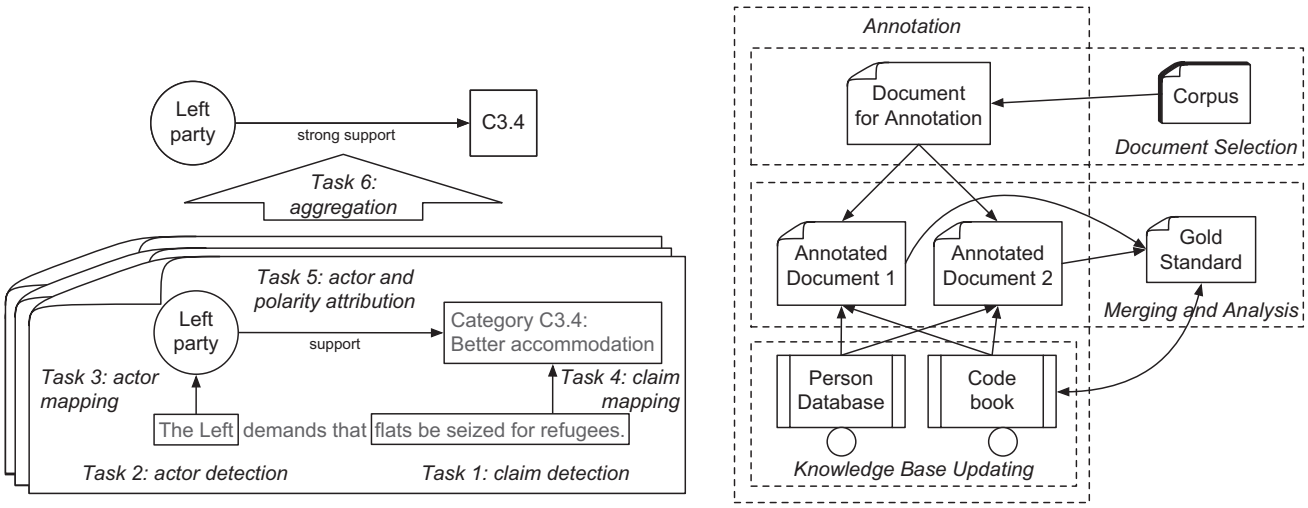

Figure 1. The MARDY approach to automatic discourse network creation. Notes: Processing steps in automatic prediction are in the left panel (adapted from Padó et al., 2019) and data flow for a manual annotation tool in the right panel (from Blessing et al., 2019).

this conceptual progress, as annotation performance can be constantly monitored. Individual performances and evaluations are available to both experts and (optionally) annotators in separate views which provide crucial statistics regarding annotation accuracy. Annotators can check their progress and, once the experts have revised their annotations, directly inspect the cases in which their annotation was suboptimal; experts can aggregate annotator errors by categories, thus uncovering trends and patterns which may suggest that the codebook needs to be updated to avoid systematic inconsistencies or points of confusion.

Goal 3 (*improving annotation quality in terms of consistency and coverage*): MARDY enables simultaneous annotation of the same document by multiple annotators via a browser-based user interface. The administration interface enables the experts to edit and merge the annotation performed by the annotators, leading to the creation of a reliable gold standard. In this stage, the expert acts as a super-annotator, who has the power of deleting/adding claims or adjusting span, category, actor, and polarity of the already detected claims.

Goal 4 (*integrating machine learning for claim detection and classification*): One incisive innovation compared to existing annotation frameworks in political science, such as MAXQDA, NVivo, Atlas.ti (Rädiker & Kuckartz, 2019), or DNA (Leifeld, 2009) is the integration of predictions of a machine learning classifier, which MARDY treats as a 'pseudo-annotator.' The pseudo-annotator takes over the tasks of claim detection and classification. Figure 2 displays the gold merging interface and it illustrates how it can be used by the experts to create the gold standard. On the left panel (blue rectangle), the system displays five candidate claims to be reviewed by the expert annotator. Candidate claims are of two types: They have been identified by a human annotator (annotator 20, marked with [20]: candidates 2, 4, and 5) or by the AI pseudo-annotator (marked with [AI]: claims 1 and 3). The panel in the middle shows the claims which were accepted into the gold standard. The panel on the right shows the text of the article; the expert has the possibility to highlight a specific candidate claim (in this example, candidate 1), thus retrieving a larger context without going through the entire article (function 'show' in the left panel). A pop-up window (activated with the 'edit' button in the central panel) allows to edit or change the details of the annotation: In this example, given that the [AI] classifies candidates into high-level categories (in this case, 800, 'Procedures'), the expert can introduce the finer-grained annotation (805, 'Additional Financing') as well as the actors and polarity. What we see in Figure 2 is a typical scenario, in which AI and human annotators turn out to be complementary. The first claim (corresponding to candidate 1) has been identified by AI and overlooked by the human annotator. The second and third claim has been identified by both human and AI, but with a different segmentation (one span for the AI, candidate 3; two spans for the human,

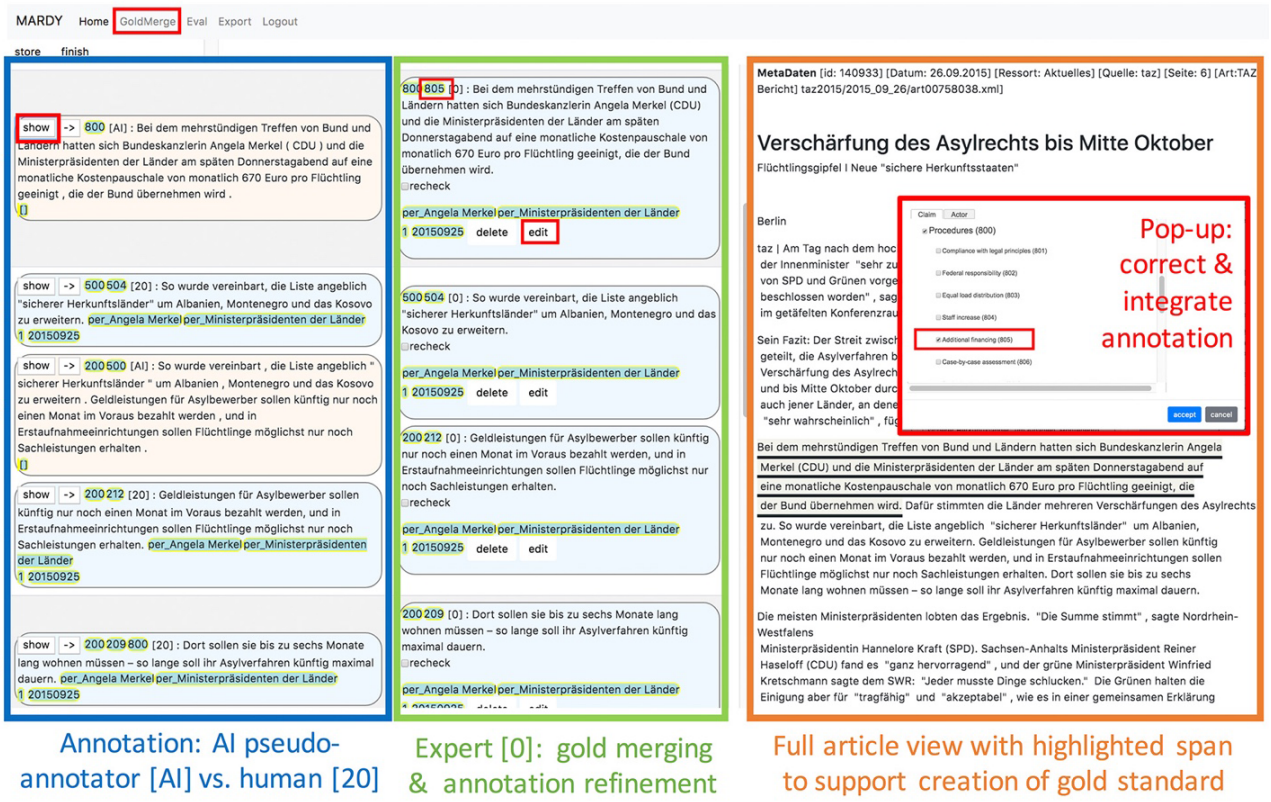

Figure 2. Merging interface for gold standard, including AI suggestions.

candidates 2 and 4). The fourth claim has been identified only by the human annotator (candidate 5).

At this point, a natural question to ask is how good the AI annotator is. We will answer this question in two steps: In Section 4, after having provided more details concerning the technical side of the AI pseudo-annotator, we will discuss its performance from a Natural Language Processing (NLP) perspective; in Section 5, we will present the results of a computer-assisted annotation experiment in which the AI will be employed to suggest relevant claims to the annotators (and not just to the experts in the gold merging stage).

4. The AI-Pseudo-Annotator: NLP Support for Claim Identification and Categorisation

This section describes the AI pseudo-annotator. It is responsible for the tasks of claim detection and claim mapping (categorisation), both implemented as (supervised) classification. Classification is the task of assigning an input to a set of pre-defined categories. We approach claim identification as a token sequence labelling task with a variant of the BIO schema (Ramshaw & Marcus, 1999). Specifically, the input to the identifier model consists of a sentence, represented as a word sequence (for practical reasons, sentence length is limited to 128 words). The claim identifier labels each word in the input with a tag from the list of B(eginning of)-CLAIM, I(nside)-CLAIM, O(utside) the claim. Claim classification is realised as a multi-label classification for each word sequence that was predicted to be a claim: The classifier assigns one or more theoretically motivated classes—as defined in the codebook—to the sequence. Note that we currently do not automatically recognise actors. To extract claim-author pairs we, therefore, adopt an 'oracle' setting where we pair up all claims that were correctly recognised automatically with their corresponding manually annotated actors.

In what follows, we provide a brief description of the dataset, the annotation scheme, data representation, and the machine learning methods we apply for the AI annotator. The description is aimed primarily at NLP experts to enable replication of our approach (see Alpaydin, 2009, for an accessible introduction to machine learning in general).

1) Dataset and classification scheme: Our dataset consists of all articles published in 2015 in the German newspaper *taz—die tageszeitung* on the issue of migration in Germany (about 2000 articles). It is steadily expanded and contains so far over 1000 fully annotated articles with more than 4500 claims (an earlier version is already freely available). We have designated a fixed, randomly drawn set of 15% of the articles as a test set. The remaining 85% of the articles serve as the training set. It contains 342 articles consisting of 12,571 sentences and 1400-word sequences are labelled as a claim. The average claim length in the training set is 20.12 words per claim. Similarly, our test set contains 159 articles, 1753 sentences and 159 claims where the mean claim length is 19.13.

The annotation schema contains 8 higher-level categories (controlling migration; residency; integration; domestic security; foreign policy; economy; society; and procedures) as well as finer-grained categories (e.g., accommodation as an integration strategy). We currently only perform automatic classification on the higher-level categories. It is not possible to classify all fine-grained categories at the desired quality. This is not a fundamental problem of granularity. Rather, it is a practical problem of (not) having a sufficient number of examples for each fine-grained class to learn reliable classifiers for them. Even the distribution of the higher-level categories is fairly skewed, as is usual in language data. We would expect more annotated examples to improve classification quality. However, idiosyncrasies of the categories also need to be taken into account. Categories with a specific technical jargon (e.g., Dublin Procedure) are generally easy to learn from a few examples, while other categories may require more examples (e.g., limiting migration). Generally speaking, what we see here is a trade-off between the interest of political science in developing detailed and specific analyses of individual debates and the annotation effort that is necessary to annotate corpora with the resulting detailed codebooks.

2) Representation and classification: The MARDY system builds on the state-of-the-art approach in NLP to model semantics that uses low-dimensional, dense vectors—so-called embeddings—to represent words (and other linguistic entities). Embeddings can be learned automatically from large corpora by exploiting the distributional hypothesis, which states that words that occur in similar contexts have similar meanings (Firth, 1957). Currently, the best performance is generally achieved with contextualised embeddings (Devlin, Chang, Lee, & Toutanova, 2019; Peters et al., 2018) obtained with deep neural models, mostly based on an architecture called Transformer (Vaswani et al., 2017) and trained on huge amounts of raw texts. There are many publicly available pre-trained models that can be used for obtaining contextualised word embeddings.

4.1. Developing Claim Identification and Classification Methods

Our claim classifier is an update of the BERT model presented in Padó et al. (2019). Similar to the earlier model, it is based on the BERT Transformer (Devlin et al., 2019). However, we made the model more language specific which leads to a modest increase in quality (see below for details). Specifically, we use the Deepset German BERT model (Deepset GmbH, 2019), which was trained on large German corpora, including Wikipedia. Next, we fine-tune the contextualised embeddings on our complete *taz* newspaper corpus (all *taz* articles in 2005, 2010, and 2015), consisting of 3,258,697 sentences and 58,411,202 words, using next sentence prediction loss as

the pretraining objective. Finally, we train the claim identifier using the 342 articles in our training set.

We use individual sentences as input to the claim identifier and process the input as suggested in the original BERT paper (Devlin et al., 2019); the input text is split into word pieces before being fed to the BERT model. The resulting token sequence that is used for classification is typically longer than the word sequence of the sentence. We ignore the predictions made for subunits during loss calculation in training and in evaluation. The classes (B-Claim, I-Claim, and O, as defined above) are assigned with a standard softmax layer. We use the Adam optimiser with learning rates of 2e-5, $\beta 1 = 0.9$, $\beta 2 = 0.999$, a batch size of 16 and a dropout with p = 0.5 on all layers. We train the classifier for seven epochs and store models and evaluation results after each iteration. As the final model, we select the model with the highest development set recall value among the subset of saved models where the recall/precision ratio is equal to, or smaller than, two. This procedure leads the claim identifier to over generate claims to some extent—a trade-off that we believe is sensible in our current pipeline architecture.

For claim classification, we assume that claims have already been identified. Each claim is assigned one or more of the eight top-level categories of the MARDY claim codebook. The basic architecture of the claim classification model is very similar to the claim identifier: again, we use a fine-tuned version of BERT to obtain contextualised embeddings. We use the Adam optimiser with learning rates of 5e-5, $\beta 1 = 0.9$, $\beta 2 = 0.999$, a batch size of 32 and a dropout with p = 0.1 on all layers. We train the classifier for seven epochs and select the model with the best macro-averaged F1 score on the development set (i.e., the model is optimised to find a good trade-off between precision and recall). The main difference is that claim classification is an instance of multi-label classification (i.e., more than one claim class can be assigned to each claim). We handle this change by replacing the softmax layer with a sigmoid layer, as a result of which multiple classes can be assigned at the same time.

4.2. Evaluation of Classifier Quality

Evaluation of classification tasks is typically carried out by computing per-class precision, recall, and F1 scores (Jurafsky & Martin, 2009). For each class T, precision measures what percentage of predictions of T is correct, while recall measures what percentage of instances of T is recovered. F1 score is the harmonic mean of precision and recall. For claim identification, we report token level precision, recall, and F1 score for the claim class. We evaluate claim classification on the test set by comparing predictions to gold standard claims and report results macro-averaged across the eight major claim categories in the dataset at the claim level. This use of a single held-out test set is standard practice in computational linguistics; an alternative would have been to use n-fold cross validation.

Table 1 lists the results of evaluating the claim identifier and classifier on the test portion of our annotated dataset. The results show that the model delivers reasonable predictions, in particular at the claim identification level. Given that we select the claim identification model to maximise recall, it is not surprising that precision is somewhat lower, but it is still at a useful level. For the claim classifier, where we instead select the model with the best overall score, precision and recall are considerably more balanced. Given that claim classification is a multi-label classification task, we consider this a promising result. To establish a comparison to previous work, the last two rows of Table 1 present results for the best claim identification (EmbTAZ:w,c+BiLSTM+CRF) and claim classification (BERT) models from Padó et al. (2019) when evaluated on our current dataset. Our current claim identification model performs two points F-score higher, with increases both in terms of precision and recall due to the better language specific pre-training. Similarly, our claim classifier performs better in terms of all metrics, with particular increases in macro averaged F-score and Recall. An additional advantage is that both classifiers now use the same overall architecture.

We believe that a high recall and a lower precision form a reasonable trade-off for semi-automatic annotation support, since human coders review the machine predictions and can therefore correct precision errors, while due to the high recall the model has a chance of finding instances which may be missed by human annotators. Note that evaluation results are always relative to the similarity of the training and test data: Since these are both drawn from the *taz* corpus and from documents with the same topic, we would expect similar results for other *taz* articles, but possibly lower results when the classifiers are applied to other corpora or other topics. This is not a problem of our specific approach, but a problem that applies in general to NLP and supervised ma-

Table 1. Precision, recall, and F1 scores of automatic models.

	Precision	Recall	F1 score
Claim Identification	0.39	0.77	0.52
Claim Classification	0.65	0.56	0.60
Claim Identification (Padó et al., 2019)	0.37	0.73	0.50
Claim Classification (Padó et al., 2019)	0.61	0.46	0.52

Note: Claim identification (at token level, for class 'claim'); claim classification (at claim level, macro averaged across classes).

chine learning: models lose quality with increasing distance between the data they were trained on and the data they are applied to.

Another potential concern is whether the automatic models are fair in the sense of not exhibiting better quality for some parts of the data than for other parts (Binns, 2018); this topic has received substantial attention in NLP in previous years (Hovy & Spruit, 2016). Since the list of such covariates of quality is open-ended, we cannot rule out a problem of this type in principle. However, we carried out two analyses. First, we checked for the influence of the political affiliation of the actor on the recall of claim identification. We did so by computing a contingency table with the true positives and false negatives of our model for each set of actors affiliated to a political party (FDP [Free Democratic Party], CDU [Christian Democratic Union], CSU [Christian Social Union], SPD [Social Democratic Party], Green Party, Left Party, and AfD [Alternative for Germany]), plus the set of unaffiliated actors, as defined by Wikidata. We carried out Fisher's Exact Test on this contingency table and did not find an influence of affiliation on recall ($n = 251$, $p = 0.83$). Second, we investigated whether the claim identifier was able to generalise properly to novel claims not encountered in the training set. To do so, we defined a claim as 'seen' if the combination of actor and category occurred in the training set (this holds for 13.4% of the claims in our test set). We found that the recall of claim identification was 94.8% on seen claims and 74.2% on unseen claims. We conclude that the model performs somewhat better on previously seen claims. However, the quality of novel claims is still decent enough to indicate that the model is able to generalise to unseen data. Therefore, its overall quality cannot be explained only by memorisation of the training data. With this in mind and based on the improved results compared to earlier models (cf. Table 1), the next section tackles the question of how these improvements and the general approach translate into the annotation process in practice.

5. Annotation Experiment

We conducted an experiment in order to test whether the support by the AI pseudo-annotator leads to an increase in annotator performance, i.e., whether it speeds up annotation (see Section 3, Goal 1) and whether it increases annotation quality (see Section 3, Goal 3). The experiment follows a design in which two separate groups are repeatedly exposed to either treatment or to no treatment over four rounds in an alternating manner (Table 2). Annotation speed is measured in average annotation time per claim, quality by computing recall, and precision and F1 scores. The articles used for this experiment are disjoint from the complete 'gold standard' dataset (comprising of the training and test sections) as described in Section 4 above. This is obviously necessary in order to avoid that annotators may remember articles that they annotated previously. Since articles for the experiment were also drawn randomly from the corpus, similar to the test set, we believe that the classifier accuracy and fairness results presented in Section 4 carry over to this dataset as well.

The participants were six experienced annotators (two senior researchers and four student assistants), who were familiar with the annotation environment and trained on the topic. The participants were assigned to group A or B (group sizes $n = 3$). We balanced the groups with respect to the number of training hours and to prevent the senior researchers to be in the same group. Depending on the group, the participants were exposed to the treatment, consisting of AI suggestions based on predictions from the classifier, or no treatment. In both cases, annotators were asked to read and manually annotate the articles. The only difference was that the treatment group was able to immediately use the pre-annotated claims from the AI pseudo-annotator. The experiment took place on the campus of the University of Bremen and ran over the course of two days and four rounds. In the first round, Group A started annotating with suggestions by the AI and Group B without (Table 2). This setting was reversed in round 2. To account for fatigue (Ellis, 1999, p. 556), the order of exposure/non-exposure per group was switched on day two (Rounds 3 and 4, respectively). This setting allows us not only to compare differences between groups but also within subjects (Ellis, 1999). In each round, ten articles had to be annotated with a time limit of 105 minutes per round, a reasonable choice given previous knowledge about typical annotation durations. The articles in each set were similar with respect to length, difficulty, and claim frequency, facilitating between-group comparisons.

In this experiment, we asked annotators to only identify and classify the claim, in order to isolate the effect of the AI support on claim detection. Information about actors and polarity was added later and thus is not part of the experiment.

The small number of participants and the involvement of the researchers limits the generalisability of the

Table 2. Design of the experiment.

	Group A	Group B
Day 1, Round 1	Treatment	No Treatment
Day 1, Round 2	No Treatment	Treatment
Day 2, Round 3	No Treatment	Treatment
Day 2, Round 4	Treatment	No Treatment

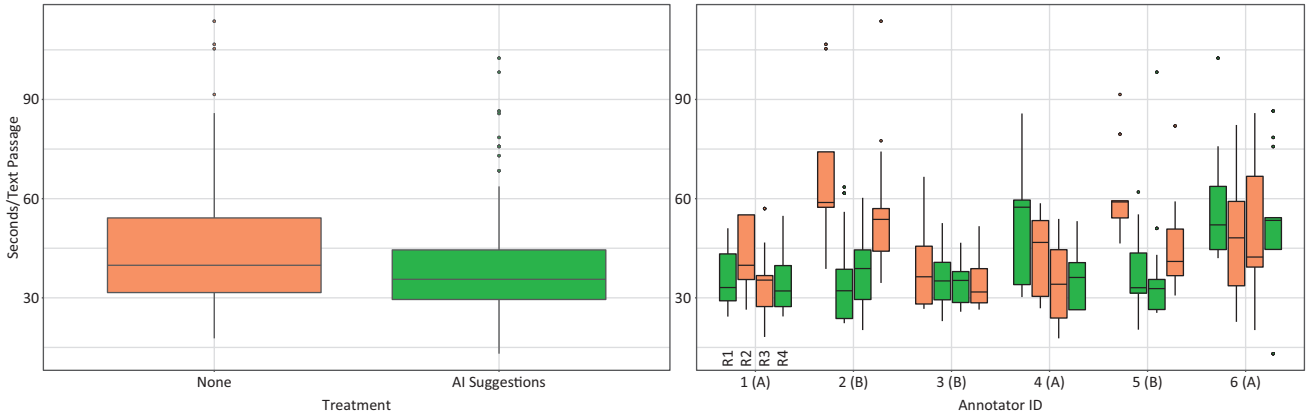

Figure 3. Annotation time per text passage. Note: Figure 3a: median time treatment vs. no treatment; Figure 3b: median time per annotator and round.

results, but it still offers a first impression of the effects that the introduction of an AI pseudo-annotator can have on human annotators. Firstly, Figure 3 shows that the support of machine learning during annotation leads to a marginal increase in annotation speed. Secondly, Table 3 demonstrates that the treatment group with suggestions from the pseudo-annotator shows much higher recall scores and an insignificant decrease in precision. Lastly, we observe a moderate increase of inter-annotator-agreement. Overall, the pseudo-annotator offers promising yet not always accurate suggestions. Over the course of the experiment, the participants annotated a total of 2555 text passages (425.8 on average) containing 3114 claims (519 on average). This resulted in a gold-standard encompassing 573 claims spread over 453 text snippets. The pseudo-annotator made 467 suggestions. Of these, 331 were accepted into the gold-standard (70.9%).

Overall, the experiment shows a slight decrease in the median value of annotation time per text passage, but the difference is not very pronounced, dropping about 10% from 39.9 to 35.6 seconds (Figure 3a). Looking at the measures for individual annotators (Figure 3b), we see that the overall gain is mainly the result of significant speed gains for two of the six annotators (ID 2, student, and ID 5, senior), while the AI support made hardly any difference for annotators 1 and 3 (both students) and for annotators 4 (senior) and 6 (student) the average time to annotate a claim with AI support was even slightly higher than without support. This shows a substantial amount of personal variation regarding the use of automatically generated suggestions.

A more rigorous statistical analysis on the basis of a fixed-effects-regression confirms these results (see Appendix 2 in the Supplementary File). More specifically, we controlled for unobserved factors (e.g., intelligence), which might fluctuate across annotators by introducing fixed effects for each participant and additionally a time trend for rounds to account for learning effects. Moreover, we included the number of claims found by each annotator per article and the article length (in tokens). The regression analysis confirms that the speed gain from pseudo-annotator suggestions is not statistically significant, and the effect size itself is rather small. During the experiment, each participant saves on average about 42 seconds per article when having access to predictions compared to the case of manual annotation (see model 4 in Appendix 2 in the Supplementary File). Annotation with AI support is thus on average about 10% quicker than without.

To assess the impact on annotation quality, Table 3 looks at recall, precision, and F1 score. We see the following results: Average precision with AI support is minimally lower than without support (0.81 vs. 0.82) but recall increases substantially and gains over five points (0.74 to 0.80). In fact, all annotators without exception exhibit a higher recall with the support of the pseudo-annotator. Together, both changes lead to an overall increase in the F1 score from 0.77 to 0.80. Out of the six annotators, four were able to increase their overall an-

Table 3. Precision, recall, and F1 score in the experiment.

Annotator (Group)	ø		1 (A)		2 (B)		3 (B)		4 (A)		5 (B)		6 (A)		*AI*
Treatment	none	AI	none	AI	none	AI	none	AI	none	AI	none	AI	none	AI	—
Recall	0.74	0.80	0.84	0.90	0.65	0.76	0.77	0.80	0.82	0.86	0.60	0.69	0.77	0.80	*0.73*
Precision	0.82	0.81	0.83	0.83	0.89	0.88	0.90	0.84	0.72	0.65	0.90	0.88	0.68	0.81	*0.71*
F1 score	0.77	0.80	0.84	0.86	0.75	0.81	0.83	0.82	0.77	0.74	0.71	0.77	0.72	0.80	*0.72*

notation quality in terms of F1 score. Annotation quality of the remaining two annotators (3 and 4) deteriorates slightly to moderately.

Overall, the results of the experiment suggest that the integration of machine learning suggestions into the annotation workflow improves annotation (at least recall and F1 score), but the speed gain is only relatively small, especially if we account for the additional time that is needed to train the AI. On its own (last column of Table 3), the AI pseudo-annotator is reasonably good but still less accurate than the average human annotator, and thus cannot replace them yet—at least if we are interested in correctly identifying all claims in a given set of texts. The remaining question, however, is if the AI annotator is good enough to build reliable discourse network representations—this is exactly the goal of the modelling experiment we report in the following section.

6. Discourse Networks

Annotating all relevant claims in newspaper articles produces data with a certain amount of redundancy because both political actors and journalists tend to repeat themselves: If an article reports three times about claim X from actor A, two times about claim Y from actor B and only once about claim Z from actor C, it effectively reports information on three different actor-claim dyads. In the evaluation approach which characterised the previous sections, a claim annotation tool would have to identify all six occurrences of these claims to get full credit, while such (near)-repetitions are often ignored in DNA because they do not provide substantial new information: Only one instance of each actor-claim dyad has to be detected. This indicates that network construction can proceed even based on a (somewhat) incomplete annotation. Often DNA studies even normalise edge-weights of actor-claim dyads across multiple articles per day, so that one specific claim from one specific actor is counted only once per day. All additional mentions of the same actor-claim dyad in the same or in other articles on this day are treated as redundant.

Figure 4 represents the network of all actors and claims present in the gold standard annotation, created from the manual and AI annotations of the 40 articles of the experiment data set. Claims not found by the AI pseudo-annotator, i.e., the AI's false negatives, and the actors that appear only in those claims are highlighted in red. In line with the expectation that the network may be less sensitive to false negatives, we find that the AI detects 77.2% of all edges, which is a four points higher

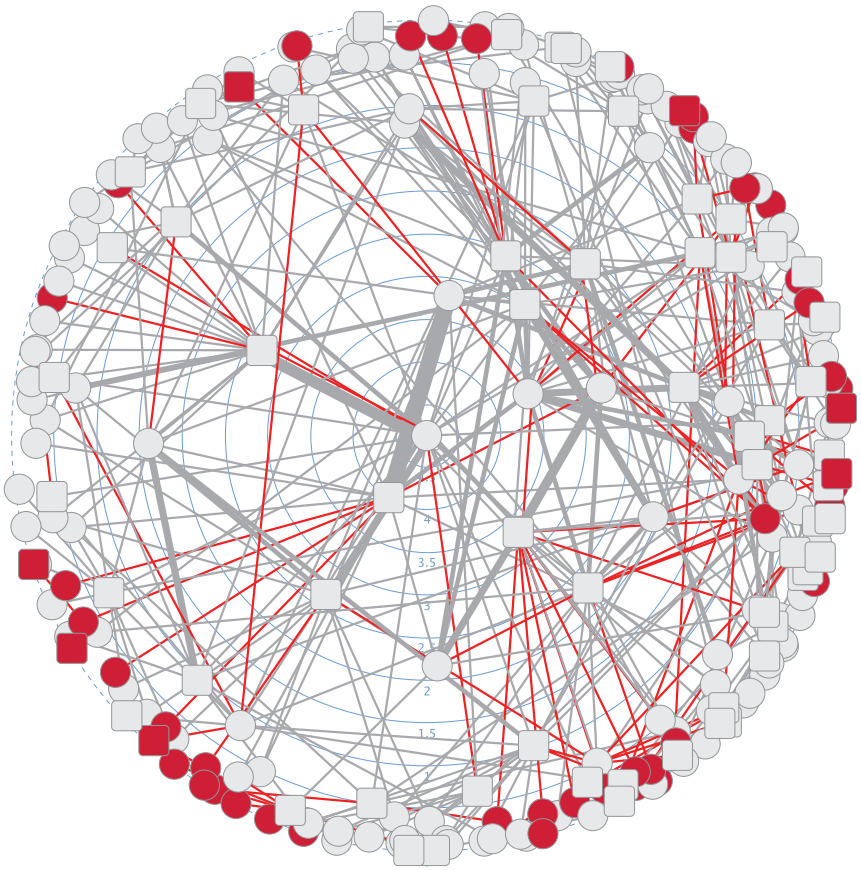

Figure 4. Discourse network from the experiment data, containing all actor-claim dyads of the manually created gold standard. Notes: Circles represent actors, squares represent claims. Actors, claims, and edges not found by the AI are highlighted in red. Placement of the nodes represents their eigenvector centrality value, nodes with higher centrality values are placed more centrally.

recall value compared to overall claim detection. More importantly, only seven out of the 77 claim categories are never detected by the AI and 80.1% of the actors are present in the AI's true positive claims (but as mentioned above, actors were manually annotated in the gold standard only, so they were not really found by the AI). Nodes not found in the AI's true positive claims account for less than 6.4% of the network's overall eigenvector centrality. In other words, the nodes not present in the AI set are mostly only marginal nodes in the network. Figure 4 illustrates this by placing nodes with higher eigenvector centrality values in the centre of the graph and nodes with low centrality values at the margins.

To further evaluate the accuracy of the AI suggestions, we can restrict our analysis to the network core, instead of looking at the complete network. There are several options to determine network cores. We use a very simple method that is particularly useful for bipartite weighted networks. In our network, we assign edge values to the actor-claim dyads that correspond to the number of occurrences of this dyad on separate dates in our data. So, if actor A makes claim X on day 1, 2 and 3, the A–X actor-claim dyad gets the value of 3. We now create a core network that consists of all edges and adjacent nodes where edge values are greater than one—a two-slice of our original network (de Nooy, Mrvar, & Batagelj, 2005, p. 98). On a substantial level, this core network contains all actors and claims for which the same actor-claim dyad was reported at least twice for different dates. It is reasonable to assume that normally only actors whose claims are reported more than once in a certain time period can have an influence on the future direction and the outcome of a political debate.

The result can be seen in Figure 5. This two-slice of the entire network captures and displays the core of the underlying discourse structure as reported in the 40 randomly selected articles of the experiment. On a substantial level, the actors and claims in the core network are no surprise for an avid observer of the 2015 migration debate in Germany. They comprise government and opposition parties and prominent political actors addressing issues that dominated the discourse in this year. But since our data set only contains 40 randomly selected articles, our focus here is not on the substantial validity of the observed discourse network.

In the context of our experiment, the much more interesting result is that the AI pseudo-annotator has found all claims in the core network. At the two-slice level, the AI is able to completely reproduce the network based on the manually annotated gold standard. Recall at this level is 100%, if we ask the system to only detect and not yet classify the claims and if we discount for the fact that automatic speaker identification is not yet implemented in the current prototype system. So far, this does not mean that we can generate core discourse networks in a fully automated process, since fine-grained categories, actor names and polarity of the claims have been added manually in the experimental setting. But the result suggests that the AI suggestions could be used in a much more far-reaching computer supported anno-

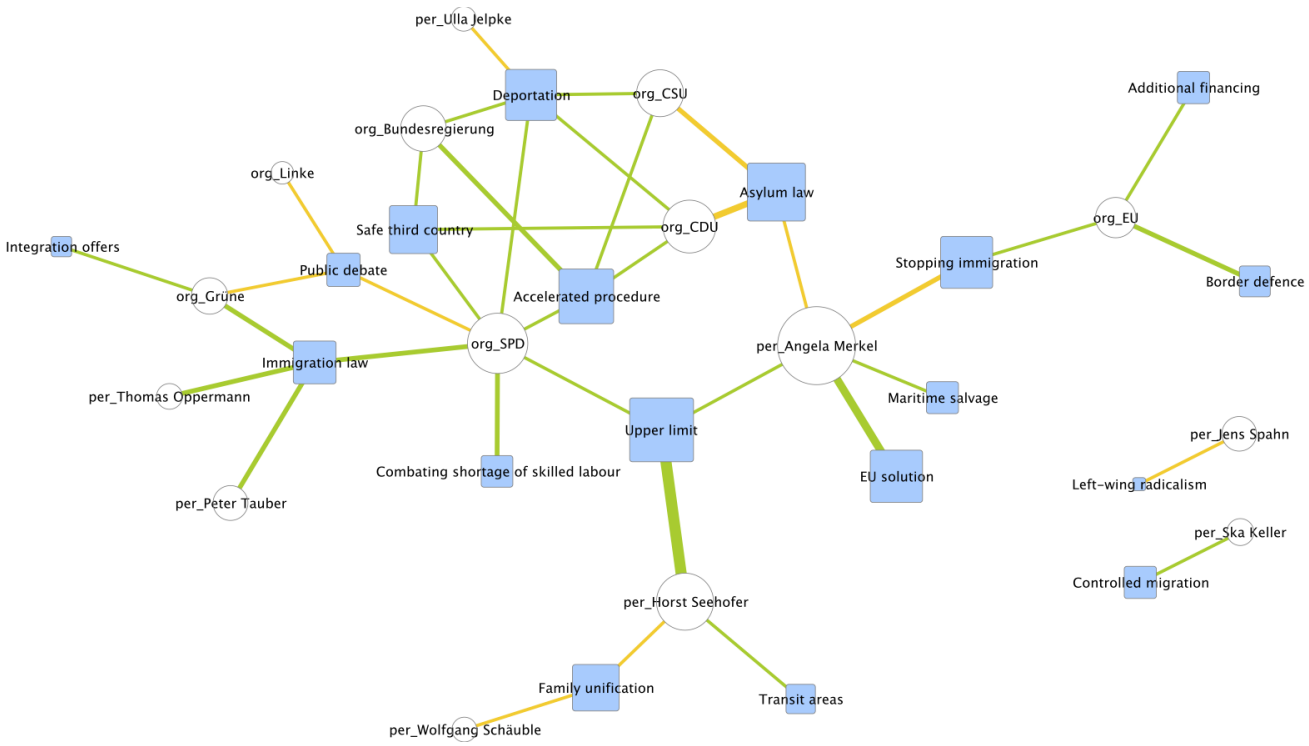

Figure 5. Two-slice of the discourse network from Figure 4 containing all actor-claim dyads mentioned at least twice in our data set. Notes: Circles represent actors, squares represent claims. Green edges represent support for the claim, orange edges opposition to the claim.

tation scenario: Instead of offering the human annotators AI suggestions, but still asking them to read the complete text of each article, a setting becomes feasible in which the human annotator has only to decide which of the AI suggestions should be accepted and which should be rejected. Since there are no false negatives in AI suggestions at the two-slice level, human annotators would only have to weed out the false positive AI suggestions in order to get an accurate representation of the core discourse network. This task is identical to creating the gold standard from the manual annotations. Limiting the manual annotation work to only this remaining task would drastically reduce the time spent on the typically laborious annotation process. Of course, this would still require the manual annotation of a large enough training set for the AI.

7. Conclusion

While the integration of machine learning in annotation workflows has been suggested before, no working systems have yet been developed that leverage machine learning not only for corpus creation and text selection but also for the actual annotation of texts using complex and multifaceted abstract categories. The MARDY annotation environment described in this article strives to offer such an integrated system.

In order to evaluate how useful such a system can be for an extensive annotation task in a research project focusing on current political debates, we have tested the performance of the system in an annotation experiment. The results show that a system can be trained to provide machine learning based annotation suggestions which improve the performance of human annotators, both in annotation speed and regarding the F1 score of annotation quality. Adding an AI pseudo-annotator thus can help to ease the time and labour-intensive task of manual annotation. However, the gains on this level are limited and it is questionable whether the additional time and expertise needed to provide AI suggestions at a sufficient level of accuracy outweigh the time and resources gained in the annotation process.

But a closer examination of the data produced by the AI pseudo-annotator reveals surprising and promising results on another level. Our results show that if we account for the fact that newspaper articles contain a significant amount of redundant information about political claims-making, and if we use the structural perspective of the discourse network approach to identify central actors and claims of a political debate, we can use an AI pseudo-annotator to provide information about the core discourse network with a very high level of recall and without compromising precision. This opens the possibility of an annotation system in which human annotators no longer have to read the complete text but only have to weed out the false positive AI suggestions.

In future experiments, the robustness of our findings has to be assessed. Open questions are to what extent an AI trained on texts from one newspaper is also able to predict claims in other news sources, whether claim prediction quality and the system's ability to recover core discourse networks differs across issues or depends on issue salience (and thus the volume of articles on an issue per time period) or the level of contention. Also, the observed differences between the annotators with support from the AI pseudo-annotator merit further investigation. MARDY is still a prototype and not a ready-to-use tool, but the description of its elements and the annotated data published with this article hopefully will help the scientific community to move forward in creating tools that allow for more detailed analyses of large text corpora in the social sciences.

A demo version of the MARDY system can be accessed at http://hdl.handle.net/11022/1007-0000-0007-DF36-2. This page also offers tutorial videos and a more detailed manual for the annotation environment, links to the documentation of the classifier code, to the classifier demo, the R scripts for experiment, and network analysis and to the data.

Acknowledgments

The research presented here was funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) within the SPP RATIO—Project No. 375875969.

Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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Politics and Governance (ISSN: 2183-2463)

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