Shared Positions on Divisive Beliefs Explain Interorganizational Collaboration: Evidence from Climate Change Policy Subsystems in 11 Countries

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Abstract

Collaboration between public administration organizations and various stakeholders is often prescribed as a potential solution to the current complex problems of governance, such as climate change. According to the Advocacy Coalition Framework, shared beliefs are one of the most important drivers of collaboration. However, studies investigating the role of beliefs in collaboration show mixed results. Some argue that similarity of general normative and empirical policy beliefs elicits collaboration, while others focus on beliefs concerning policy instruments. Proposing a new divisive beliefs hypothesis, we suggest that agreeing on those beliefs over which there is substantial disagreement in the policy subsystem is what matters for collaboration. Testing our hypotheses using policy network analysis and data on climate policy subsystems in 11 countries (Australia, Brazil, the Czech Republic, Germany, Finland, Ireland, Japan, Korea, Portugal, Sweden, and Taiwan), we find belief similarity to be a stronger predictor of collaboration when the focus is divisive beliefs rather than normative and empirical policy beliefs or beliefs concerning policy instruments. This knowledge can be useful for managing collaborative governance networks because it helps to identify potential competing coalitions and to broker compromises between them.

Introduction

Collaboration between organizations has become an increasingly important part of public administration. In particular, collaboration between public organizations and various stakeholder organizations, such as businesses, trade unions, nongovernmental organizations (NGOs), and scientific organizations, is often prescribed as a potential solution to the current complex problems of governance (Bardach 2001; Calanni et al. 2015; Innes and Booher 2010; Lubell 2004; Mullin and Daley 2010). This is especially true concerning problems like climate change, that cut across multiple policy sectors and levels of government and call for solutions that have effects on multiple stakeholders. Interorganizational collaboration in such settings potentially leads to greater efficiency, increased government accountability, resolution of conflicts and higher levels of program success (Fung and Wright 2001; Hicks et al. 2008; Johnston et al. 2011; Leach 2006).

It is not surprising, then, that public administration scholars have studied collaboration from various perspectives, using concepts like collaborative governance (Ansell and Gash 2018; Emerson 2012; Johnston et al. 2011), collaborative public management (Leach 2006; O'Leary, Gerard, and Amsler 2006), collaborative partnerships (Calanni et al. 2015; Leach et al. 2014), collaborative institutions and collaborative resource management (Heikkila and Gerlak 2013). The literature has examined several factors that explain why organizations choose particular collaboration partners: institutional roles (Ingold and Leifeld 2016), competencies (Weible et al. 2020), expertise (Schneider et al. 2011) trust (Berardo and Scholz 2010), reputational power (Leifeld and Schneider 2012), and similarity of beliefs (Calanni et al. 2015; Henry 2011).

In this article, we seek to better understand the role of beliefs in the formation of collaboration relationships. Our endeavor is motivated by the Advocacy Coalition Framework (ACF, Sabatier 1998; Sabatier and Weible 2007). The ACF argues that organizations predominantly collaborate with those whose beliefs are similar to their own (Weible et al. 2020). This tendency often leads to the formation of competing

advocacy coalitions. When organizations holding a given set of beliefs—for example beliefs supporting ambitious climate change policies—forge collaboration relationships with each other, those holding opposite beliefs react by collaborating with each other, creating an opposing group of like-minded actors (Fischer and Sciarini 2016; Heaney and Leifeld 2018; Ingold and Fischer 2014; Sabatier 1998). Thus, while the collaborative governance literature has explored the many benefits of collaboration, including the management of conflict, the ACF literature has shown that collaboration does not always lessen conflicts. When collaboration relationships are formed selectively with like-minded actors, coalitions are formed and conflict lines may become stronger. While healthy competition between different viewpoints is an integral part of the making of public policy, in extreme situations this tendency can result in a stalemate that blocks sometimes much-needed policy change (Ingold 2011).

From the point of view of public administration organizations and scholars seeking to develop forms of collaborative governance that are capable of pushing forward policy change, knowing what drives the formation of collaboration ties is crucial. This knowledge can be useful for managing collaborative governance networks because it helps, for example, to identify potential competing coalitions and to broker compromises between them.

Many studies have found support for the ACF's belief homophily hypothesis which argues that belief congruence is associated with collaboration (Ingold and Fischer 2014; Matti and Sandström 2013; Weible 2005; Weible and Sabatier 2005). But it is not clear exactly what kinds of beliefs elicit collaboration. The ACF argues that the kind of beliefs that do so are policy core beliefs—beliefs concerning the nature of policy problems and basic ideas about the solutions to those problems (Sabatier and Weible 2007). But, as we will show, definitions and operationalizations of belief categories in different studies have varied, leading to inconsistent results concerning the association between beliefs and collaboration (Jenkins-Smith et al. 2014; Kukkonen, Ylä-Anttila, and Broadbent 2017; Matti and Sandström 2013; Weible et al. 2020).

In this article, we propose and test the *divisive beliefs hypothesis*. We hypothesize that agreement between two organizations over divisive beliefs—those beliefs that cause the most disagreement in the policy subsystem at large—contribute the most to the likelihood of a collaborative relationship forming between these two organizations. We thus test the idea that the beliefs that drive collaboration in a policy subsystem at a given time cannot be defined theoretically a priori; which beliefs do so is an empirical question. This is because when organizations see that there are others who disagree with their own position, they seek to collaborate with those who hold beliefs similar to their own to counter that opposition. Consequently, agreement on beliefs over which there is disagreement in the policy subsystem is what matters the most to the formation of collaboration relationships. To give an example, beliefs regarding nuclear power as means to reduce greenhouse gas emissions are among the most divisive beliefs in most of our case countries.

We test our *divisive beliefs hypothesis* against the following two competing hypotheses derived from the literature on policy collaboration: the *normative and empirical policy beliefs hypothesis*, which expects collaboration to be driven by agreement over normative and empirical policy beliefs that can be defined theoretically (Sabatier and Weible 2007), and

the *policy instrument beliefs hypothesis*, which expects belief similarity concerning policy instruments to be a key driver of collaboration (Ingold 2011; Leifeld 2013). We do so by estimating exponential random graph models (ERGMs) using data on collaborative relationships in national climate change policy subsystems in the following 11 countries: Australia, Brazil, the Czech Republic, Germany, Finland, Ireland, Japan, Korea, Portugal, Sweden, and Taiwan. We find evidence that divisive beliefs, indeed, play a stronger role in policy collaboration than do either theoretically defined normative and empirical policy beliefs or beliefs concerning policy instruments. In conclusion, we discuss how our findings can inform scholars of collaborative governance (Ansell and Gash 2018) and public organizations that seek to engage in effective management of governance networks (Provan and Patrick 2008; Sørensen and Torfing 2009) so that the networks remain responsive and capable of driving policy change.

Theoretical Approach

Among the many factors that have been hypothesized to drive interorganizational collaboration, belief similarity has attracted considerable attention, especially among scholars applying the Advocacy Coalition Framework. In the ACF, beliefs are divided into deep core, policy core, and secondary beliefs ranging from general to more specific beliefs (Weible et al. 2020), and it is the middle tier, policy core beliefs, that is hypothesized to elicit collaboration between organizations. *Deep core beliefs* are the most fundamental and general level of beliefs as they relate to many policy subsystems (Sabatier and Weible 2007). These are, for example, beliefs about the fundamental nature of human beings, the ordering of various ultimate values, the basic criteria of distributive justice, and sociocultural identity. Deep core beliefs also include the traditional left/right scale of the political spectrum. Deep core beliefs are very resistant to change. *Policy core beliefs*, instead, apply to a specific policy subsystem only, and they represent the basic normative commitments and causal perceptions across an entire subsystem. They include beliefs about the priority of different policy-related values, such as economic development or environmental protection. Policy core beliefs also include beliefs about the distribution of welfare; how authority should be divided between governments and markets; the roles of different parties involved, including the general public and elected officials; and the overall seriousness and causes of policy problems (Sabatier and Jenkins-Smith 1999). Policy core beliefs are also presumed to be quite resistant to change, but they might still change over a long period of time with new experiences or information (Sabatier and Weible 2007). *Secondary beliefs* are the most specific type of beliefs and include instrumental preferences and beliefs necessary to implement policy core beliefs, such as the appropriateness and efficacy of specific tactics or detailed rules or budgetary issues within a specific program. Secondary beliefs are usually defined to be relevant only for a subset of the policy subsystem and are thus narrower in scope than policy core beliefs (Jenkins-Smith et al. 2014; Weible et al. 2020).

The ACF posits that policy core beliefs—not deep core beliefs or secondary beliefs—contribute the most to the formation of collaboration relationships. Deep core beliefs are too general to elicit collaboration, secondary beliefs are too specific. But, like Goldilocks' porridge, policy core beliefs are just right—in terms of their level of generality—to make

organizations collaborate (Jenkins-Smith et al. 2014; Weible et al. 2020). This collaboration with like-minded others makes it more likely that the collaborating organizations get to translate their beliefs into policies (Matti and Sandström 2013).

However, according to Weible et al. (2020), empirical results concerning the role of beliefs as drivers of collaboration are mixed, and systematic evidence about the effect of different belief types on collaboration is lacking. Many studies have found beliefs to influence collaboration (Ingold and Fischer 2014; Matti and Sandström 2013; Weible 2005; Weible and Sabatier 2005). Some scholars have qualified these findings by arguing that beliefs are relevant for explaining collaboration only in conflictual policy subsystems (Gronow, Wagner, and Ylä-Anttila 2020). Henry, Lubell, and McCoy (2011), in turn, argue that although belief similarity predicts collaboration, the effect does not seem to be driven primarily by policy core beliefs but rather by aggregated belief systems. Yet, others have found that not just policy core beliefs, but also secondary beliefs explain collaboration (Ingold 2011; Matti and Sandström 2013). Although Sabatier (1998) had already recognized this inconsistency, no principled solution has been proposed thus far.

We believe that an important reason for these mixed results is that the way the association between beliefs and collaboration has been studied thus far lacks an important part of the mechanism connecting the two. We suggest that the main assumption of the ACF, which states that actors within advocacy coalitions share policy core beliefs, has been incorrectly interpreted to mean that agreement over policy core beliefs would on its own lead to collaboration. This interpretation misses the conflict part of the story. The ACF literature has always assumed that some level of conflict within a subsystem is a prerequisite for the emergence of collaboration. Collaboration relationships begin to form *when there is dispute over policy core beliefs* in the policy subsystem (Weible et al. 2020). This means that organizations seek to collaborate with likeminded others especially when they observe opposition to their own policy goals. Thus, what lacks from the previous formulation of the belief homophily hypothesis is that for belief similarity to elicit collaboration, there also needs to be enough incongruence in beliefs within the given policy subsystem.

Sabatier (1998, 109–10) argues that differences in beliefs produce distrust in opponents and eventually lead to a "devil shift," a tendency to overestimate opponents' bad intentions and capacities. Distrust based on disagreement over beliefs can act as a mechanism behind decisions the actors make about their relations to others. Lee and Lee (2018) and Lee and Dodge (2019) have studied how belief and policy goal incongruence lead to distrust between policy organizations. According to their results, diverse visions over sustainability and preferred policy goals lead to distrust between organizations involved in environmental policymaking (Lee and Lee 2018).

However, Lee and Dodge (2019) also found that distrust can motivate actors to maintain contacts with their opponents. Their results show that organizations may communicate with distrusted others for multiple reasons. Most organizations in their study of a fracking policy network in the United States maintained some communication ties with distrusted actors to monitor and compare their opponents' views and actions, to convince distrusted actors to change their beliefs, to discourage their opponents, or to confirm their existing negative

attitudes toward distrusted organizations (Lee and Dodge 2019). Some organizations even collaborate with distrusted actors to balance competing viewpoints, but this kind of collaboration was reported only by public agencies and legal organizations as an attempt to remain in neutral positions (Lee and Dodge 2019). Even though distrust based on disagreement over policy goals can motivate actors to communicate with their opponents to some extent, it is likely that distrust causes most organizations to avoid long-term collaboration with opponents.

It is also possible that a mechanism called avoidance bias is at work, where belief differences contribute more to avoiding collaboration than belief similarities contribute to incentivizing collaboration (Henry, Lubell, and McCoy 2011). According to theories of network formation, even a small tendency to avoid link formation between different types of actors can alone lead to heavily segregated network structures (Henry, Pralat, and Zhang 2011). It is also likely that in addition to avoiding collaboration with actors holding different beliefs, organizations actively choose to collaborate with likeminded others as a strategic choice to resist the opposition they observe and to increase their own influence in the policymaking process. Similarly, studies on negative partisanship have found that support for political parties is based more on negative attitudes toward one party than actual affiliation with another (Abramowitz and Webster 2016) and that this mechanism becomes more important as differences between political parties increase (Abramowitz and Webster 2018). This suggests that there may be common mechanisms that affect both electoral and policy processes.

The Divisive Beliefs Hypothesis

Reviewing the mixed results of earlier research, Henry, Lubell, and McCoy (2011) and Weible et al. (2020) have suggested that the relative influence of different types of beliefs on collaboration may vary according to contextual factors. "Contextual factors," however, can mean many different things, ranging from the structures of national political institutions to the current phase of the policy process and the policy funding context (Kammerer et al. 2021; Lee, Rethemeyer, and Park 2018). How then, and why, should the context matter when studying the role of belief similarity in the formation of collaborative relationships? If disputes over beliefs are assumed to drive organizations to collaborate with likeminded others and avoid collaboration with opponents, the study of the association between beliefs and collaboration should focus on those beliefs over which disagreement exists in the policy subsystem. We suggest that this is a way to take the policy context into account, as it is context dependent which beliefs cause the most disagreement.

Previous research on the belief homophily hypothesis has resulted in mixed evidence as a result of both (1) neglecting the role of conflict in the policy subsystem and (2) the lack of a systematic way of defining which beliefs are important and why. We propose the concept of *divisive beliefs* as a potential solution to both problems. We define divisive beliefs as *those beliefs over which there is empirically measurable substantial disagreement among the actors in the policy subsystem.* Furthermore, we argue that agreement over those particular beliefs that are in dispute is what matters for collaboration, rather than belief similarity as such. On the flipside, this means that the beliefs on which there is a wide consensus in

the policy subsystem are not that relevant when it comes to the formation of collaboration relationships.

Importantly, what constitutes divisive beliefs may vary between policy subsystems and over time and is not limited to specific belief categories. We argue that when policy actors perceive that there is prominent disagreement on their own beliefs, they seek to collaborate with like-minded others to counter that opposition regardless of whether the conflict is over normative or instrumental beliefs. For example, if consensus has been reached on the severity of a given problem, more instrumental concerns, such as those concerning the choice between policy instruments to solve the problem, may become the divisive beliefs that make actors collaborate with those they agree with and avoid collaboration with actors holding opposing beliefs. Previously contested issues might also become less divisive if perceptions of the policy issue shift. According to Markard, Suter, and Ingold (2016), this has been the case in Swiss energy policy as renewable energy sources have become more mature and economically viable.

To give an example from our data, there is considerable disagreement in most of our case countries over the statement "My country should take a leading international role in greenhouse gas reduction." The divisive beliefs hypothesis leads us to expect that those organizations agreeing with this statement tend to collaborate with one another, and those disagreeing with it with one another, which potentially contributes to the formation of two competing coalitions. In other countries or at another time the beliefs that are divisive could be different. Thus, we test the following hypothesis:

H1: Organizations tend to collaborate with those other organizations who they agree with regarding divisive beliefs.

Alternative Hypotheses

Our goal is to clarify exactly what kinds of beliefs contribute to the formation of collaborative relationships between policy actors. To test whether our divisive beliefs hypothesis is an improvement over the traditional belief homophily hypothesis, we also study the effect of belief similarity on collaboration with two predefined belief categories: normative and empirical policy beliefs (H2) and beliefs concerning policy instruments (H3).

Henry, Lubell, and McCoy (2011) and Weible et al. (2020) suggest that mixed findings regarding the role of beliefs in collaboration may result from the variety of ways in which beliefs are conceptualized and measured in different studies. This is because there can be a lack of a consistent logic and method for assigning beliefs to different levels of the ACF belief hierarchy. Thus, the same sort of beliefs could be defined as deep core beliefs, policy core beliefs, or secondary beliefs depending on the study or the policy subsystem. In particular, scholars disagree on which kind of beliefs should be counted as policy core beliefs that elicit collaboration and which kind of beliefs are secondary and thus, according to the ACF, should not matter for the formation of collaboration relationships.

To give a few examples of the divergence in what constitutes policy core beliefs, Weible and Sabatier (2005) and Weible (2005) define policy core beliefs as beliefs concerning the specific policy studied as well as beliefs about the role of science, the economic consequences, and the benefits for people affected by the policy in question. Lubell (2007)

defines policy core beliefs in the agricultural water policy subsystem as economic conservatism and environmentalism. Leach and Sabatier (2005) measure policy core beliefs by asking respondents to evaluate the relative seriousness of 13 problems in relation to the specific policy studied. Henry, Lubell, and McCoy (2011) define inclusiveness and adherence to smart growth principles as policy core beliefs and beliefs regarding the severity of problems in the planning region as secondary aspects. Ingold (2011), in turn, includes environmental effectiveness, economic effectiveness, competitiveness, and equity in the category of policy core beliefs, and treats policy instruments, which include voluntary agreements, a CO_2 tax, a so-called climate penny, and tradable permits as secondary aspects. Contrary to ACF expectations, she finds that both policy core beliefs and beliefs concerning policy instruments, defined as secondary aspects, contribute to the formation of collaborative relationships.

Leifeld (2013), in contrast, argues that beliefs concerning policy instruments are in fact not secondary but, on the contrary, exactly the type of beliefs that makes policy actors collaborate. He finds that in German pension politics, belief similarity regarding policy instruments, such as increased immigration or increased female labor participation as solutions to the problems of the current pension system, are what draws policy actors together. Kukkonen, Ylä-Anttila, and Broadbent (2017) argue that beliefs concerning policy instruments cannot be a priori defined either as policy core or as secondary beliefs. In their view, beliefs concerning policy instruments have a different role in coalition formation depending on the policy subsystem and can thus be classified as policy core beliefs in some contexts but not in others.

Because scholars tend to disagree, particularly on whether beliefs concerning policy instruments drive the formation of collaboration relationships or whether they are secondary, we test the following two alternative hypotheses:

H2: Organizations tend to collaborate with those other organizations who share their normative and empirical policy beliefs.

H3: Organizations tend to collaborate with those other organizations who share their beliefs regarding specific policy instruments.

Methods and Material

We tested our hypotheses using survey data on climate change policy subsystems in 11 countries, including information on the collaboration network within each subsystem. A number of studies have looked at environmental and, specifically, at climate policy subsystems in the ACF context (Fisher, Leifeld, and Iwaki 2013; Ingold 2011; Ingold and Fischer 2014; Kukkonen, Ylä-Anttila, and Broadbent 2017; Wagner and Ylä-Anttila 2018). Although most ACF applications are qualitative case studies (Pierce et al. 2017), a growing number of researchers use social network analysis techniques (Fisher, Leifeld, and Iwaki 2013; Gronow, Wagner, and Ylä-Anttila 2020; Ingold 2011; Kukkonen, Ylä-Anttila, and Broadbent 2017; Wagner and Ylä-Anttila 2018). Most of these studies, however, are single-country cases. While comparative research on policy networks is often called for (Ingold and Varone 2012; Weible et al. 2020), it is rarely carried out in practice.

Case Countries and Data Collection

Our data were collected by 11 country teams of the Comparing Climate Change Policy Networks (COMPON) project in Australia, Brazil, the Czech Republic, Germany, Finland, Ireland, Japan, Korea, Portugal, Sweden, and Taiwan. The country case selection is intended to maximize diversity, the idea being that if our hypotheses find support in a wide range of different cases, they can be considered quite robust. The countries exhibit diversity in terms of their political institutions, including both unitary (e.g., Finland, South Korea) and federal (e.g., Germany, Brazil) countries as well as corporatist (e.g., Japan) and pluralist (e.g., Australia) political systems. They also include countries that have enacted highly ambitious climate change policies (e.g., Sweden) and those that have done so to a much lesser degree (e.g., the Czech Republic). Furthermore, the countries are located in different regions of the world and differ in terms of economic development.

Network boundary specification is a key task of any network study (Borgatti, Everett, and Johnson 2013; Laumann, Marsden, and Prensky 1989). Specifying the network boundary refers to determining which actors are a part of the network. In our case, each country network includes those key actors that have the most influence over the formation of national climate change policies across different sectors of society: governmental organizations, NGO's, business organizations, and scientific organizations. The first step of our boundary specification, thus, was to ensure that these different societal sectors are well represented. Second, the data in each country were collected by a team of local researchers who used their case knowledge, the existing academic literature, and reviews of media coverage to identify the most influential actors involved in domestic climate policy. Third, the final list of respondents in each country was refined by consulting national climate policy experts from different sectors who were not otherwise associated with our research project. Because we are interested in the networks that contribute to the formulation of national climate policies, we only selected organizations that have a national reach. Some of these organizations do operate also at the international or subnational levels, but organizations focusing their efforts solely above or below the national level were excluded from the sample.

The surveys were administered in different ways depending on the country: face-to-face, online, or on paper. In cases where online surveys were used, the respondents were contacted in advance by telephone. The individual to respond within each organization was the person responsible for climate policy or environmental policy. In the (rare) organizations where such positions did not exist, we targeted a person in a leading position who was comfortable with answering on behalf of the whole organization. The list of responding organizations was the same as the roster presented to the respondents, from which the respondents indicated their collaboration partners. The respondents could also name additional organizations not included in the roster. For a more thorough description of the country selection and the process of specifying the network boundary in each country, see Ylä-Anttila et al. (2018).

Survey datasets like ours are never perfect, as some nonresponse inevitably occurs. On the other hand, getting the data needed to address our research question—information on collaboration, beliefs and relevant controls for hundreds of organizations across 11 countries—would hardly be feasible by any other means. In fact, collecting such data even through surveys is so labor intensive that network data sets covering so many countries are extremely rare. Our response rates overall are similar (Table 1), and in many countries significantly higher, than other studies of political elite networks published in leading journals (e.g., Henry, Lubell, and McCoy 2011; Jasny and Fisher 2019; Leach and Sabatier 2005). Nevertheless, it is necessary to consider the potential effects of response rates on our results. There is some controversy in the literature over how well ERGMs handle missing data. While ERGMs are generally considered robust to some missing data (Lusher, Koskinen, and Robins 2013, 14), it has also been argued that biased results due to missing data are certainly possible (Koskinen and Snijders 2013, 162–3). In this light, it seems reasonable to look more closely at the quality of our sample in those countries where response rates are considerably below the 65% range that is often—but not always—achieved by studies of elite political networks such as those we refer to above. Supplementary appendix 6 provides additional information on the quality of our sample in these three countries, namely Australia (response rate 45%), Brazil (46%), and Japan (57%). In Brazil and Japan, the data seems to be of high quality. The most important indicator here is

Table 1. Case Countries

	Number of Respondents	**Governmental (*n*)**	**Science (*n*)**	**Business (*n*)**	**NGO (*n*)**	**Response Rate (%)**	**Year**
Australia	43	5	6	13	19	45	2015
Brazil	62	9	1	21	31	46	2013
The Czech Republic	91	32	18	9	32	69	2016
Germany	51	10	10	21	10	73	2012
Finland	82	20	14	32	16	85	2014
Ireland	52	20	3	16	13	91	2013
Japan	72	14	6	34	15	58	2012
Korea	87	26	12	26	16	82	2010
Portugal	57	19	17	9	12	68	2016
Sweden	69	21	9	22	17	70	2015
Taiwan	87	22	n/a[a]	17	43	82	2011

[a]Included in governmental organizations.

the makeup of the sample as regards our dependent variable, the collaboration network indegree (i.e., how many collaboration links each actor "receives"). In both countries, the mean indegree of respondents is clearly higher than that of nonrespondents, and the majority of the 10 most central actors are among the respondents. Our sample, thus, covers well the most central actors in the network that is our main object of analysis. Looking at reputational power yields a similar result: in both countries the respondents are more influential than nonrespondents, and the majority of the ten most influential actors in the network are among the respondents. The case of Australia is somewhat more problematic. Even here, our sample does capture the most central actors in the collaboration network; the mean indegree of respondents is higher than that of nonrespondents, and seven out of the 10 most central actors have responded. However, the reputational power of the nonrespondents in Australia is higher than that of the respondents and 7 of the 10 most influential actors have not responded. We take this limitation into account by conducting the analyses also without Australia as a robustness check.

Models and Key Variables

We analyzed the formation of collaboration ties between actors with exponential random graph models (ERGMs) designed to take into account interdependencies between actors in the network (Cranmer and Desmarais 2017; Robins et al. 2007). An ERGM provides a researcher with the possibility to model exogenous covariates and structural dependencies at the same time. The main assumption of an ERGM is that network formation is a stochastic process where the presence or absence of other ties and actor- or edge-level attributes can influence tie formation (Robins et al. 2007). A shortcoming of ERGMs is that they assume every relevant feature of the network to be present in the model specification. Therefore, misspecification can lead to biased parameter estimates (Cranmer and Desmarais 2017), and a careful assessment of the model fit is especially important. We conducted the analyses using the *ergm* package in the statistical computing environment R (Hunter et al. 2008).

The dependent variable in our analysis was the collaboration network in each country. Information about collaboration was gathered by asking each organization: "*With which of the listed organizations does your organization have a long-term and mutually collaborative relationship in relation to climate change policy?*"

The key independent variables were policy beliefs, classified into three categories, to test which kinds are the strongest predictor of policy collaboration—normative and empirical policy beliefs, beliefs concerning policy instruments, and divisive beliefs. Data on beliefs were collected in terms of actors' climate policy beliefs by asking each respondent to indicate their beliefs about a varying number of questions on a five-point Likert scale (1 = "Strongly disagree," 5 = "Strongly agree"). The number of questions varies between 30 in the Czech Republic and Finland and 67 in Brazil. Following the ACF, we measured *normative and empirical policy beliefs* using survey questions on moderately general, policy subsystem-wide beliefs. These questions include, for example, beliefs about climate change as a problem and the ambitiousness of the current climate policy in the respondent's own country as well as questions about global equity related to

climate change mitigation. In addition, beliefs about the importance of economic values in relation to climate change and the general attitude toward renewable energies are defined as normative and empirical policy beliefs. We measured *beliefs concerning policy instruments* with questions on the importance of specific policy measures. These included both technical measures, such as different energy sources, and political measures, such as national and international agreements and laws. To measure *divisive beliefs*, we identified the top 10 most divisive issues in each country by looking at the standard deviation of all variables measuring normative and empirical policy beliefs and beliefs concerning policy instruments. The 10 most divisive beliefs were used as their own category, but they were not excluded from the other two belief categories. In other words, all belief variables used in these analyses belong to either the category of (1) normative and empirical policy beliefs, or (2) instrumental policy beliefs.

To compute the belief similarity variables, we followed Leifeld and Schneider (2012). For each country, three dissimilarity matrices using all belief variables in the particular category were constructed using Euclidean distance. The dissimilarity matrices were converted into similarity matrices by subtracting each dissimilarity value from the maximum dissimilarity value. The similarity matrices were normalized between zero and one to make sure the number of variables used in their construction has no effect on their scale. The resulting matrices are used as edge covariates in network models.

We model the effect of belief similarity on collaboration ties in three different models for each country. To avoid problems of multicollinearity between the belief similarity variables, we include them in the models separately. These variables are in part calculated using the same beliefs, and thus belief similarity regarding divisive beliefs correlates quite strongly with the other two belief similarity variables in some countries. We excluded all actors from the models that had missing values for more than half of the variables in any of the belief categories (normative and empirical policy beliefs, beliefs regarding policy instruments, or divisive beliefs) because for those actors it was not possible to fully calculate the similarity matrices. These data are comparable between countries although there are some differences in the policy beliefs included in the surveys. A comprehensive list of the belief questions for each country is included as supplementary appendix 1.

Control Variables

Actors with formal decision-making power can attract collaboration ties from other actors that try to influence decision making (Stokman and Van den Bos 1992). In addition, previous studies have found that, in some contexts, public authorities are named as collaborative partners more often, and in others, less than would be expected by chance (Gronow, Wagner, and Ylä-Anttila 2020). Therefore, we controlled for the effect of public authorities by adding a nodal covariate for incoming ties to public authorities. We defined public authorities as governmental organizations (ministries or governmental agencies) and political parties.

Reputational power, or the perceived influence of an organization, can also have an effect on how often they are named as collaborative partners (Weible 2005). For example, resource dependence theory suggests that actors seek to collaborate with powerful actors (Pfeffer and Salancik 2003).

We measured reputational power by adding how many times each actor was named as influential by other actors, and we used this measure as a nodal covariate in the models. This measure was obtained by presenting the respondents with a roster of all organizations in the policy subsystem and asking: *"Which of the listed organizations are especially influential in domestic climate change politics?"* Perceived influence was measured using the same matrix as an edge covariate in the models.

We include several endogenous network terms in each of our models that have been found in other studies to explain the formation of collaboration ties in policy networks (Fischer and Sciarini 2016; Gronow, Wagner, and Ylä-Anttila 2020). The first of these is the edge term, which is comparable to the constant term in other statistical models. Second, we include the mutual term to capture the tendency for actors to reciprocate ties, which, when positive and significant is indicative of mutually supportive and trusting relationships. Third, the two-path term is included to control for the number of actors that are connected via a third actor. These third actors tend to be both named as a collaboration partner and to name others as their collaboration partners. Their presence and the patterns of their network ties increases the potential for coordination between non-collaborating actors. Next, we include the gwidegree and the gwodegree terms to account for the distribution of incoming and outgoing collaboration ties in the networks. The gwidegree term enables us to check for the tendency for actors to collaborate with already popular actors, analogous to the Matthew Effect (Merton 1968) and known as preferential attachment in the network literature (Barabási and Albert 1999). Preferential attachment can occur in collaboration networks where there are some actors that are perceived to have particularly useful information or other resources by many others (Lee, Lee, and Feiock 2012). The gwodegree term allows us to investigate if there is a small number of actors in any of the networks who are particularly active creators of collaboration ties. This may occur when an actor, such as a government agency or department, is mandated or obliged to engage with a broad range of stakeholders. Finally, we include two terms to model transitive configurations. The first of these, GWESP, captures how frequently two directly connected actors i, j are also indirectly connected to one another through a third actor k. The second term, GDWSP, models the presence of configurations where two actors are both connected to the same third actor regardless of whether or not they collaborate with one another. Transitive configurations have been argued to form in networks as they allow actors to build trust with other actors, as well as to monitor, reward and sanction the actions and behaviors of other actors (Nisar and Maroulis 2017). Each of the four geometrically weighted terms requires the modeler to include a decay parameter to control for the impact of additional counts of the same network structure to the corresponding network statistics. In each case, we use the decay parameter that produced the best model fit in each country.

To find the best fitting model for each country, we ran the models with different sets of endogenous variables and different decay parameters. From among these models, the best fitting three based on the Akaike information criterion (AIC) were further compared using other goodness-of-fit diagnostics and Markov chain Monte Carlo (MCMC) trace plots. Because all three best-fitting models showed reasonably similar fit based on all measures, and the results were robust across different model specifications, we chose the model to be presented in the results based on AIC.

Results: Belief Divisiveness

We begin by reporting the overall divisiveness of climate change-related beliefs in our case countries. Supplementary appendix 1 lists the beliefs that are the most divisive in each country. In all countries, some beliefs classified as normative and empirical policy beliefs and some beliefs regarding policy instruments are among the most divisive. The range of the most divisive beliefs is large, confirming the assumption that climate policy subsystems in different countries are divided based on different beliefs. In all the countries combined, 52 different statements belong to the most divisive ones. Still, there are some similarities between these contexts. The most fundamental normative and empirical policy beliefs, such as *"Climate change is currently occurring"* and *"Human activities are an important driver of climate change,"* are among the least divisive ones in all these countries. Most respondents in our case countries thus believe that climate change is real and that human activities play an important role, confirming the conclusion of international comparative analyses of national media coverage of climate change, according to which climate science skepticism is mostly confined to the United States (Painter 2011; Painter and Ashe 2012). However, there is no such consensus for other normative and empirical policy beliefs. This means that the policy debate on climate change has largely moved beyond disagreement on the reality and seriousness of the problem, and the questions that are now divisive relate to who should act and by what means. For example, the statements *"My country should take a leading international role in GHG reduction"*, *"Climate change cannot be contained as long as developed countries continue their current level of consumption"*, and *"The transition to a renewable energy supply is too costly"* are all among the most divisive beliefs in 6 out of 11 countries. Among the questions on policy instruments, whether the expansion of nuclear energy makes a sensible contribution to tackling climate change is among the most divisive beliefs in 9 out of 11 countries.

The example of nuclear power shows how issue divisiveness is linked to the differing contexts of the case countries and the agenda of the public and policy debates. The only two countries where nuclear power is not a divisive issue are Germany and Portugal. In Germany, the decision to phase out nuclear energy in the wake of the Fukushima accident was just made the year before our data collection and the public opinion was very strongly against nuclear power, so there was not much room for contestation over this issue (Schneider 2011). Portugal does not have any nuclear reactors and public opinion is against them (Khalip, Rodriguez, and MacSwan, 2017), so suggesting new ones is hardly a policy option, making nuclear power a non-divisive issue among policy actors. In all the other countries we studied, there is some controversy over whether nuclear power is a viable means for reducing GHG emissions, making this belief divisive in our data.

A closer look at individual countries provides additional support for the idea that the divisiveness of policy beliefs among the surveyed organizations reflects the economic and political context and the public and policy agenda. For example, in the Czech Republic, carbon taxes and renewable

Table 2. Estimates for Belief Similarity Variables in the ERGMs of All Countries.

		AU	BR	CZ	DE	FI	IE	JP	KR	PT	SE	TW
Model 1: belief similarity regarding normative and empirical policy beliefs	Estimate	1.587	0.951	0.736	0.903	0.612	0.653	1.804	1.584	0.489	1.081	0.482
	p	.000	.000	.000	.000	.000	.016	.000	.000	.202	.003	.030
	SE	0.389	0.261	0.168	0.259	0.169	0.271	0.372	0.310	0.383	0.358	0.222
Model 2: belief similarity regarding policy instruments	Estimate	0.382	1.364	0.350	1.137	0.642	0.677	1.419	1.539	1.091	0.997	0.351
	p	.341	.000	.048	.000	.000	.015	.000	.000	.007	.011	.092
	SE	0.391	0.304	0.176	0.301	0.153	0.279	0.387	0.284	0.408	0.391	0.209
Model 3: belief similarity regarding divisive issues	Estimate	1.586	1.673	0.845	0.717	0.971	0.529	2.710	1.718	0.833	0.983	0.400
	p	.001	.000	.000	.009	.000	.049	.000	.000	.046	.000	.080
	SE	0.459	0.282	0.191	0.276	0.165	0.269	0.434	0.308	0.418	0.269	0.228

energies are among the most divisive issues because of the country's strong coal industry and its proponents are often successful in contesting these ideas in public and policy debates (Ocelík et al. 2019). In Finland, the issue of a national law that requires the reduction of GHG gases was among the most divisive, because such a law was being prepared by the government at the time of data collection and was a topic of much political contestation (Gronow and Ylä-Anttila 2019). In Ireland, to give a third example, sector specific legal limits to GHG emissions are a divisive issue, because the agricultural sector is the major emitter, agricultural lobby organizations are influential players and ministries and political parties were, at the time of data collection, divided on this issue (Wagner and Ylä-Anttila 2018).

Based on the standard deviations of the variables, there are no clear differences between countries in the divisiveness of climate change-related beliefs in general. Also, the distributions of the 10 most divisive beliefs show that in all countries there are issues that clearly divide the actors into two camps.[1]

Results: The Effect of Belief Similarity on Collaboration

In table 2, we present the estimates for the belief similarity variables in the ERGMs that explain collaboration with the similarity of normative and empirical policy beliefs (model 1), the similarity of beliefs concerning policy instruments (model 2), and the similarity of divisive beliefs (model 3). The tables present coefficients and standard errors only for the belief similarity variables; the full models are presented in supplementary appendix 3. Note that the belief similarity variables

are included in the models separately and that the parameter estimates presented in table 2 are combined from three different models.[2] To make it easier to compare the parameter estimates of different belief similarity variables, the highest estimate for a country is colored red.

Belief similarity regarding divisive issues is a significant predictor of collaboration in 10 out of 11 countries: Australia, Brazil, the Czech Republic, Germany, Finland, Ireland, Japan, Korea, Portugal, and Sweden but not in Taiwan (table 2). Belief similarity regarding normative and empirical policy beliefs is associated with a larger probability of collaboration in 10 out of 11 countries, namely Australia, Brazil, the Czech Republic, Germany, Finland, Ireland, Japan, Korea, Sweden, and Taiwan but not in Portugal (table 2). Belief similarity in terms of policy instruments is related with a larger probability of collaboration in 8 out of 11 countries, namely Brazil, Germany, Finland, Ireland, Japan, Korea, Portugal, and Sweden but not in Australia, the Czech Republic, or Taiwan (table 2). In five of these countries, namely Brazil, the Czech Republic, Finland, Japan, and Korea, the parameter estimate for belief similarity concerning divisive issues is larger than the estimates for the other two belief similarity measures. In two countries, namely Sweden and Taiwan, the parameter estimate for belief similarity regarding normative and empirical policy beliefs is larger than the estimates for the other two belief similarity measures. In Germany and Portugal, the same is true for belief similarity regarding policy instruments. In Australia, the parameter estimates for belief similarity regarding normative and empirical policy beliefs and belief similarity concerning divisive issues, and in Ireland, the parameter estimates for belief similarity regarding normative and empirical policy beliefs and belief similarity regarding policy instruments, are equally large. Overall, all three hypotheses are thus supported in most of these case countries. However, our divisive beliefs hypothesis is more strongly supported by the parameter estimates than the two alternative hypotheses.

The models testing our divisive beliefs hypotheses also fare slightly better in terms of fit than the models testing the other two hypotheses. The variation in the goodness of fit within a country is quite small according to the AICs presented in table 3 below. In six countries, the model fit is

[1]We measure divisiveness using standard deviation (SD) because it is a simple indicator that captures very well what can intuitively be understood as belief divisiveness. The idea that SD captures divisiveness well is supported by the fact that the beliefs we found to be divisive using this measure reflect well those issues that earlier research has identified as contested ones in the public and policy debates in each country case (see the main text above). It could of course be argued that from a political viewpoint, a situation in a hypothetical two actor policy subsystem where one actor strongly agrees with a belief statement (and gets the value 1 on our Likert scale) and another one is neutral (and gets the value 3) is different from a situation where one somewhat agrees (2) and the other somewhat disagrees (4), while the SD, and by our definition divisiveness, in these two situations is identical. To enable the reader to evaluate whether such differences might be meaningful in our data, supplementary appendix 2 provides the exact distributions of the responses to all divisive issue questions in our survey in each country. Judging by those figures and considering the reasons described above we think SD is an appropriate indicator of divisiveness.

[2]Belief similarity variables are included in the models separately due to multicollinearity issues. However, we present the results of models including all belief similarity variables in the same model in supplementary appendix 3, table A3T4 as a robustness check. The results of those models are in line with the results presented here. .

best when belief similarity concerning divisive issues is included in the model. These countries are Brazil, the Czech Republic, Finland, Japan, Korea, and Sweden. In two countries, Australia and Taiwan, the model including belief similarity regarding normative and empirical policy beliefs fits the data slightly better than the other models; and in Germany, Ireland, and Portugal, the same is true when belief similarity regarding policy instruments is included. A more thorough evaluation of the model fit using goodness-of-fit plots and MCMC trace plots is presented in supplementary appendix 4 for the best-fitting model in each country.

We also tested for the possibility that there is an interaction between the effects of divisive belief similarity and policy core belief similarity. In other words, it could be that what matters for collaboration is not agreement on divisive issues or on policy core beliefs in itself, but the intersection of the two. To test for this possibility, we re-ran the models so that they included an interaction term for policy core belief similarity and divisive issue belief similarity. We found, however, that the effect of divisive beliefs is not related to the level of agreement over policy core beliefs in 9 out of the 11 countries. Supplementary appendix 5 reports the model results and plots for the interaction effects, using the approach developed by Heaney and Leifeld (2018).

As stated before, the low response rate and high reputational power of the nonrespondents in Australia make it reasonable to explore whether our results change if Australia is left out of the analysis. Our results remain very similar without Australia; belief similarity in general is associated with a higher likelihood of collaboration, and divisive beliefs are more strongly associated with collaboration than the other two types of beliefs we tested for. Excluding Australia from the sample, we find that belief similarity regarding divisive issues is a significant predictor of collaboration in 9 out of 10 countries, belief similarity regarding normative and empirical policy beliefs in 9 out of 10, and belief similarity regarding policy instruments in 8 out of 10 countries. In five of these countries, the parameter estimate for belief similarity concerning divisive issues is higher than the estimates for the other two belief similarity measures; the same is true for beliefs concerning normative and empirical policy beliefs as well as for beliefs concerning policy instruments in two countries. In one country, the parameter estimates for belief similarity regarding normative and empirical policy beliefs and belief similarity regarding policy instruments are equal.

Results: Control and Endogenous Variables

In this section, we report the main results regarding the control and endogenous variables included in the ERGMs. More detailed results of the control and endogenous variables are presented in supplementary appendix 3 (tables A3T1, A3T2, and A3T3). In line with previous findings, public authorities can either be more or less popular collaboration partners than other types of actors depending on the context (Gronow, Wagner, and Ylä-Anttila 2020). In our models, public authorities receive more collaboration ties in Sweden and Taiwan than would be expected by chance but fewer in Korea and Portugal. In Australia, Brazil, the Czech Republic, Germany, Finland, Ireland, and Japan, being a public authority does not have an effect on the probability of being a popular collaboration partner. As expected, perceived influence makes

Table 3. Model Comparison Based on the AIC

	AU	BR	CZ	DE	FI	IE	JP	KR	PT	SE	TW
AIC M1	820.96	2184.36	2599.35	1392.43	4962.39	1161.56	1165.64	2455.37	1257.77	1552.28	3577.98
AIC M2	843.52	2172.16	2614.45	1390.71	4954.48	1160.87	1181.26	2456.86	1252.58	1555.37	3580.20
AIC M3	830.47	2161.78	2599.12	1397.99	4936.94	1164.06	1134.79	2450.93	1255.29	1549.93	3580.16
Best fit	M1	M3	M3	M2	M3	M2	M3	M3	M2	M3	M1

actors more popular collaboration partners than would be expected by chance in all the countries. This is in line with the assumptions of resource dependence theory (Pfeffer and Salancik 2003). Reputational power, however, is significantly associated with collaboration only in five countries, namely Finland, Ireland, Japan, Korea, and Portugal.

We now turn to the results for the endogenous terms. The two-path statistic is negative and significant in all countries, indicating the presence of bridging actors in the networks. These are actors who collaborate with pairs of actors who do not collaborate with one another and who could potentially play a role in managing conflict and facilitating knowledge exchange (Crona and Parker 2011; Levy and Lubell 2018; Sabatier and Jenkins-Smith 1993). We also find that actors in all countries except Czech Republic and Germany reciprocate collaboration ties. Their presence is the basis upon which larger groups of collaborating actors depends. The combination of the geometrically weighted terms that we use in our models varies slightly across countries to maximize model fit for each case. The in/significance of the results for the terms used in each country are the same across the three models. A negative and significant coefficient for the gwidegree statistic indicates that most of the actors in a network have a similar number of incoming ties (TW), whereas a positive coefficient indicates that a small number of actors are particularly popular collaboration partners (CZE, DE, IE, KR). Conversely, a negative coefficient for the gwodegree indicates that most of the actors in a network have a similar number of outgoing ties (BR, FIN, JP, KR, PT, SE, TW), while a positive coefficient indicates that a small number of actors are more active in creating collaboration ties (IE). The positive coefficient for triadic closure (GWESP) in all countries signifies that collaboration ties that close triads are more likely to occur in the networks than collaboration ties that do not close them. A positive GWDSP statistic signifies that those actors who already share collaboration partners are less likely to collaborate with one another (BR, FIN, KR).

Discussion and Conclusions

Collaboration between public organizations and various stakeholder organizations is often prescribed as a potential solution to the current complex problems of governance, such as climate change. Belief similarity has been hypothesized to be one of the significant drivers of collaboration, but the evidence concerning the association between beliefs and collaboration has been mixed (Henry, Lubell, and McCoy 2011; Weible et al. 2020).

In this article, we argued that one reason for the mixed results is that different scholars have focused on different kinds of beliefs. We further argued that the kind of beliefs that elicit collaboration is context-dependent; different kinds of beliefs may do so in different policy subsystems and at different times. Consequently, we proposed and tested the *divisive beliefs hypothesis*: Organizations tend to collaborate with those other organizations who they agree with regarding divisive beliefs—those beliefs over which there is substantial disagreement in the policy subsystem. The rationale behind this expectation is that when organizations perceive prominent disagreement over their own beliefs, they seek to collaborate with like-minded others to counter their opposition. Furthermore, avoidance bias (Henry, Lubell,

and McCoy 2011) and distrust (Lee and Lee 2018; Sabatier 1998) may make organizations avoid collaboration with those whose beliefs are different from their own. This is akin to the tendency of negative partisanship in party politics, where support for parties is based as much or more on negative attitudes towards other parties (Abramowitz and Webster 2016, 2018).

Fitting ERG models on data on climate change policy subsystems in 11 countries, we found that inductively selected divisive beliefs are, as we expected, the strongest predictor of collaboration relationships, although theoretically predefined normative and empirical beliefs and beliefs concerning policy instruments also predict collaboration quite well.

These findings show that collaboration is more likely among like-minded organizations, especially when disagreement is present. According to ACF theory, such collaboration of the like-minded likely leads to the formation of competing coalitions and in extreme cases, to stalemates blocking policy change (Ingold 2011). These findings can be useful to scholars and practitioners seeking to develop arrangements of collaborative governance (Ansell and Gash 2018) and manage governance networks (Provan and Kenis 2008; Sørensen and Torfing 2009) in a way that makes networks capable of generating policy change. Recent research has suggested that public administration organizations may alleviate conflicts between competing coalitions by seeking to broker relationships between them (Gronow, Wagner and Ylä-Anttila 2019). As Elizabeth Koebele (2019) has pointed out, such brokerage aims at creating collaborative policy subsystems containing "cooperative coalitions who continue to disagree . . . but negotiate and work together" (Weible 2008, 625). Our findings suggest that a useful first step of such brokerage efforts is to map the beliefs that are particularly divisive in the given context and the collaboration relationships formed around taking the same side on these divisive issues. Public organizations may then Findings by Lee and Lee (2018) suggest that by mapping these beliefs and relationships and by seeking to collaborate with organizations across distrust created by belief differences, public administration organizations can potentially balance between divergent perspectives, maintain objectivity, and increase their responsiveness to citizens.

Our approach has focused on the formation of collaboration relationships between pairs of organizations. These relationships are the building blocks of advocacy coalitions, but it is worth noting that we have not analyzed the coalition structures present in the different policy subsystems we study. In other words, we do not know whether one of these subsystems has, for example, two competing coalitions that are equally strong, but less connected; another one two competing coalitions that are equally strong, but better connected across coalitions; and yet another one dominant coalition and one weak opposing coalition. Whether such differences in coalition structures affect the relationship between beliefs and collaboration remains an area for further research.

This study is the first to investigate the effect of belief similarity on interorganizational collaboration using an extensive and comparable dataset from multiple countries around the world. Our results contribute to the literature on the drivers of collaboration by showing that divisive beliefs influence collaboration between organizations and by demonstrating that what beliefs are divisive is context-dependent. This knowledge can be useful for managing

collaborative governance networks because it helps in identifying potential competing coalitions and to broker compromises between them.

Supplementary Material

Supplementary data is available at the Journal of Public Administration Research and Theory online.

Data Availability

The data and code underlying this article can be found for replication purposes in the Harvard Dataverse online repository https://doi.org/10.7910/DVN/SBGETC.

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