



Evaluating conflict in collaborative environmental governance: A study of environmental justice councils

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Abstract

The formal engagement of diverse stakeholder groups in environmental policy design and implementation is increasingly common. While engaging diverse stakeholders in common fora can help address complex environmental dilemmas, insofar as different stakeholders have varying perspectives and resources to contribute, this same variance can lead to intractable conflicts. While policy scholars have developed various conceptual approaches to understanding conflict in the policy process, few scholars have applied conceptual approaches to understand how policy conflicts are reflected in interpersonal communications among diverse stakeholders. In this article, we draw on environmental justice council meeting minutes and use qualitative, computational, and statistical methods to analyze, over time: (i) the extent and severity of policy conflict observed among council actors; (ii) the association between actor-level attributes and conflict, as conveyed in two-way communication between actors; (iii) the association between actor's sector and change in conflict; and (iv) variation in conflict across council activities. By exploring the overtime association between policy conflict and attributes of policy actors (e.g., sectoral affiliation and interpersonal attributes), our analysis addresses not

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only the influence of the number of interactions for an actor at the meeting but also how they are interacting at the meeting by leveraging their position in the meeting communication network. Our article contributes to the study of the public policy process and collaborative governance, drawing attention to how conflict materializes in a collaborative forum engaged in policy making.

KEY WORDS

collaborative governance, conflict, diversity, environmental justice councils

INTRODUCTION

Collaborative governance refers generally to the sustained engagement of diverse arrays of policy stakeholders within the policy process to advise or carry out policy formulation and/or policy implementation activities (Innes & Booher, 2003; Leach et al., 2014; Siddiki & Goel, 2017). Drawing on a wide variety of policy process theories and frameworks, policy scholars have contributed substantial insights on collaborative governance, including, the various forms that it takes in different policy contexts, what motivates its use and design, how policy actors engage within it, and individual, group, and policy outcomes associating thereto (Ansell & Gash, 2008; Siddiki et al., 2022).

Despite the extensive study of collaborative governance that has taken place over the last two decades on these cognate topics, one particular topic that has gone relatively under-attended is policy conflict. Policy conflict, or disagreement among policy actors about the content, purpose, and/or implementation of policy (Yi et al., 2022), serves the policy process inasmuch as it reflects the possibility of expressing diverse viewpoints in the prioritization of policy goals, how policies are formulated, and how policies are carried out (Ulibarri, 2023; Yi et al., 2022). Further, it is an expected outcome in venues that, prescriptively or organically, engage diverse arrays of policy stakeholders (Weible & Heikkila, 2017). Yet, there is a relative dearth of empirical scholarship on conflict in policy process scholarship.

Within the context of a collaborative governance case of an environmental justice council, we respond to this research gap by exploring the following four questions: (1) What is the pattern of conflict observed in the environmental justice council over time, where conflict is measured as the number of conflict statements made by individuals in council meetings? (2) What is the association between actor-level attributes and conflict, as conveyed in two-way communication between actors? (3) Do actors with different sectoral backgrounds experience differing levels of conflict while participating in councils, as reflected in their communications? (4) Does conflict vary by the type of activity in which council actors are engaged, namely, joint information or knowledge-sharing activity? In responding to these questions, we offer guidance on the conceptualization and measurement of conflict within our collaborative governance case, in addition to also shedding light on how diversity in individuals' attributes and roles in meetings link to their differential experiences with conflict amidst the collaborative process.



Environmental justice councils are typically composed of a diverse array of stakeholders—including government, community members, and relevant organizations (e.g., environmental and justice oriented non-profits, chambers of commerce)—and are focused on advising on the development and implementation of policies that prevent communities of color and low-income from disproportionately bearing environmental burdens as well as disproportionately failing to receive environmental benefits. They are often mandated with this charge through government policies (e.g., legislation, executive orders) that define with varying degrees of specificity their composition, scope of responsibilities, and expected outputs. Among the kinds of topics that councils address are: climate change planning, disaster management, reduction of pollution in overburdened communities, equitable conservation and public lands use, clean energy transitions, sustainable infrastructure, and civil rights. Given the composition of councils as well as the array of topics that they are typically charged with attending, there is a reasonable chance of observing conflict within council deliberations, which this article analyzes along the four aforementioned questions.

This article proceeds as follows. Section “Literature Review” provides a brief review of scholarship on collaborative governance and conflict. Section “Study Context: A State-Level Environmental Justice Council” offers an elaborated discussion of environmental justice councils and the qualities of councils that make them suitable cases in which to evaluate our research questions. Section “Methods” describes the data and analytical strategies used in the study. Section “Results” presents the results of the study. Section “Discussion” contextualizes the results within broader policy process scholarship and discusses the practical implications of the research.

LITERATURE REVIEW

There is now a vast body of scholarship that evaluates cases of collaborative governance in the public policy process, recognizing both the ubiquity and salience of collaborative governance in policy agenda setting, design, and implementation. One relatively understudied concept within this body of research, however, is conflict. Policy process scholars have called for further inquiry into the study of conflict within policy-making environments, and even particularly within policy action situations in which diverse sets of stakeholders are being convened and repeatedly interacting in policy activities (Weible & Heikkila, 2017). Yet, as Weible and Heikkila (2017) argue, “theories and frameworks of policy and politics typically treat conflict as a background concept where it is assumed to exist, detached from explanations of its sources and effects, and measured indirectly as political mobilization, political activities, or competing values” (Weible & Heikkila, 2017, p. 24). Relatedly, extant policy process scholarship offers little guidance or evidence for the different expected patterns of conflict observed in collaborative governance arrangements engaged in different policy-making and implementation activities (Emerson & Nabatchi, 2015; Jenkins-Smith & Sabatier, 1993; Lubell et al., 2020; Weible, 2008).

Meanwhile, collaborative governance scholarship offers mixed expectations or findings regarding how collaborative governance shapes conflict and vice versa. Some suggest that collaborative governance can help ameliorate conflict among actors working towards consensus (Ansell & Gash, 2008; Bryson et al., 2006; Emerson & Nabatchi, 2015; Ostrom, 1990), while others suggest that collaborative governance may result in an entrenchment of persistence of conflict, as the collaborative process itself leads to greater belief divergence among actors (Jenkins-Smith & Sabatier, 1993; Koebele & Crow, 2023; Weible, 2008). In such cases, collaborative governance

scholars have tended to posit and evaluate how conflict, characterized at the group-level, materializes over time (Koebele & Crow, 2023; Vantaggiato & Lubell, 2022). While useful in its own right, such group-level characterizations of conflict and conflict dynamics leave gaps in understanding when and how conflict materializes at the individual level, and the implications of this for collaboration outputs and outcomes.

In part reconciling the previously identified gaps in the extant policy process and collaborative governance research, policy process scholars have focused on relating interpersonal conflict to features of groups or group contexts in which individuals are interacting. For example, Lubell and colleagues (Lubell et al., 2020; McLaughlin et al., 2022) show that forums associated with “hot button issues” and the inclusion of broad actors, as well as whose actors are focused on zero-sum strategies are associated with greater conflict; Ulibarri (2023) shows planning processes that are more collaborative rather than hierarchical in nature are associated with greater conflict as more viewpoints are included and must be resolved; and Koebele and Crow (2023) show that individuals within collaborations can still negotiate agreements despite strengthening belief divergence and conflict in multi-decade forums.

This article aims to add to this recent policy process literature, as the authors seek to better understand conflict among collaborative groups engaged in the policy process by focusing on the individual within the collaborative venue. As such, we leverage attributes of the actor as well as an individual's actions in coordination activities to better understand the patterns of conflict over time in collaborative governance venues. The following paragraphs identify individual attributes and group dynamics that are expected to influence the patterns of conflict in collaborative governance venues.

First, policy process and collaborative governance scholars suggest that attributes of actors, particularly their sectoral affiliation, are expected to associate with different levels of conflict observed. As outlined by Innes and Gruber (2005), different sectoral groups both leverage different types of knowledge and view their role in collaboration differently (Innes & Booher, 2003; Sabatier, 2007). The use of different forms of knowledge is identified as a major impetus for conflict in groups engaging participants from different sectors (Innes & Gruber, 2005; Weible, 2008; Weible & Heikkila, 2017). Innes and Gruber (2005) argue that technical bureaucrats are driven by the notion of a “good rational plan”, which is achieved when the standards set by legislation are addressed, objective information and data are considered, and alternative options are systematically weighed. While Innes and Gruber, like others before them (Friedmann, 1987; Lindblom, 1959; Ostrom, 1990), highlight that these types of technical-bureaucratic decisions are often divorced from day-to-day influences and actions, fail to consider the full scope of issues and alternatives, and are prone to individual biases, they also highlight that bureaucratic actors often lean on their expertise and data as objective truths that cannot be argued against. In contrast, Innes and Gruber also identify a “social movement” style of actor (often citizens) who organizes to push back against a mainstream policy. In situations dominated by technical information, citizen actors are expected to challenge these technical framings, as they aim to implement policies that better fit their vision and values (Innes & Gruber, 2005). In this way, citizen actors are identified as more conflictual, as they aim to challenge the technical information and traditional approaches of bureaucratic actors. At the same time, bureaucratic actors are expected to be less conflictual, as they dismiss many of the citizens' interests as biased while further leveraging the “technically right answers” that they see as value-neutral.

Additionally, scholars of collaborative governance (Koebele & Crow, 2023; Ulibarri, 2023) as well as group and team dynamics (Jehn, 1995; Jehn & Mannix, 2001; Pondy, 1967) have worked to examine conflict as it is associated with specific activities rather than a normalized



pattern of conflict over time. As such, more work is needed to understand how conflict is associated with the different coordination activities required in collaborative governance. Two key activities commonly observed in collaborative governance venues include coordination as informational work (e.g., knowledge sharing and joint fact finding) and relationship building activities (e.g., value alignment and joint problem-solving). While these coordination tasks are identified as important, they are also variably identified as points of conflict identified across theory.

First, presenting new information through knowledge sharing and joint fact finding can be seen as a contentious action associated with greater conflict in the group (Weible, 2008). Knowledge is often filtered based on an actor's belief system; such that there is a tendency to assimilate knowledge that accords with one's beliefs and reject that which does not (Sabatier, 1987; Weible, 2008). When new information contradicts an actor's beliefs, conflict can arise as they work to rebuke the information. Second, the literature suggests that value-alignment is a focal point of conflict within collaborative groups. Value alignment through sharing interests, concerns, and values; developing shared meaning and definitions; and deliberating candidly is identified as a conflict ridden but necessary activity (Emerson & Nabatchi, 2015; Ulibarri, 2023; Ulibarri et al., 2020). Finally, when dealing with the wicked problems commonly addressed with collaborative governance, stakeholders may encounter difficulty in coming to agreement on what actions should be taken even when the actors can agree on the problem at hand (Emerson & Nabatchi, 2015; Sabatier & Weible, 2019). In these cases, actors may successfully develop a mutual understanding of their values and goals, but the same actors may struggle to engage in joint problem solving (Ansoll et al., 2020; Emerson & Nabatchi, 2015; Weible & Heikkila, 2017). While this scholarship broadly identifies why conflict should emerge during different activities, little scholarship has worked to measure and examine the emergence of conflict during different tasks in collaboration governance venues (Ulibarri, 2023).

Furthermore, with the call to more clearly develop the study of conflict in policy process literature, these same scholars, of late, have impressed the need to further develop the conceptualization and measurement of "diversity" within collaborative governance. Diverse stakeholder representation is crucial to the very definition of collaborative governance and an improved understanding of its implications is called for. This call for improved understanding specifically begs for improved knowledge about how diversity, variably conceived, links to different procedural, individual, collective (i.e., group-level), and policy outcomes (Siddiki & Goel, 2017).

It is at this intersection that this article is placed—actors with more diverse viewpoints and divergent lived experiences in collaborative governance venues often lead to greater amounts of conflict (Koebele & Crow, 2023; Ulibarri, 2023). With these diverse interests, values, and experiences at the table, conflict can be seen as a vital dynamic of collaboration. While literature often focuses on avoiding conflict, there are scholars who suggest conflict can be used strategically in such venues. As stated above, conflict can be used by community groups to challenge dominant actors (Innes & Gruber, 2005). Conflict can be the result of venues that leverage diverse viewpoints (Ulibarri, 2023) as a result of inclusive governance structures rather than extractive participation mechanisms (Quick & Feldman, 2011). Finally, conflict might be seen as a strategic mechanism for underrepresented actors to gain inclusion in the discussion (Dobbin & Lubell, 2021), challenging traditionally accepted participation, scope, and authority—a task seen as fundamental to environmental justice venues (Dobbin, 2021). Each of these examples of conflict in collaborative governance venues argues that conflict is not inherently bad nor a thing to be avoided, rather conflict has a place in complex, multi-viewpoint collaborative governance venues.

Attention to conflict in such venues would further current research on conflict in collaborative governance groups, which traditionally has focused on mitigating or avoiding conflict in favor of consensus. Along these lines, we follow recent work (Koebele & Crow, 2023; Ulibarri, 2023) and classic scholarship (Jehn, 1995; Jehn & Mannix, 2001; Pondy, 1967) that not all conflict is bad—if anything, conflict is needed. Yet, little work has examined patterns of conflict dynamics at the individual level in collaborative governance venues. While we might acknowledge that not all conflict is bad, we must also work to better understand patterns of conflict in such venues.

STUDY CONTEXT: A STATE-LEVEL ENVIRONMENTAL JUSTICE COUNCIL

The data for this article represents a single case of a state-mandated environmental justice council. Environmental Justice (i.e., EJ) is defined by the U.S. Environmental Protection Agency as “the fair treatment and meaningful involvement of all people regardless of race, color, faith, national origin, or income, in the development, implementation, and enforcement of environmental laws, regulations, and policies” (US EPA, 2021). Passed in 1994, Executive Order 12898 charged federal agencies with addressing the disproportionate burden of pollution and other environmental externalities on communities of color and low income and is often seen as a turning point for environmental justice in the U.S. political system (Petersen et al., 2006). Since this landmark policy, environmental justice has continued to gain attention across all levels of government in the U.S. (Grafton et al., 2015). The growing prevalence of publicly mandated environmental justice councils at different levels of government can be seen as one signal of the growing societal consciousness around environmental justice. Furthermore, the growing interest in environmental justice orients on meaningful engagement meant to shift traditional power dynamics and bring previously marginalized groups, those that often receive environmental burdens most severely, to the table (Dobbin, 2021; Holifield, 2001; Morrison et al., 2019; Schlosberg, 2004). While this type of inclusion, which shifts power, is fundamental to environmental justice literature, the data available for this study orients on communication at the individual-level, which can materialize in terms of differential experiences and values for participants in collaborative governance groups.

Environmental justice councils (i.e., “EJ councils” or “councils”) are venues in which citizens, government actors, non-governmental organizations, and other parties are convened to collectively advise on the design and implementation of EJ policies. EJ councils are formally created through policies, such as executive orders, legislation, or regulation, which specifically identify key aspects of their design, such as their stakeholder composition, duties, expected activities and outputs, and requirements for a minimum number of meetings in a year, and, thus, are unique when compared to other forms of EJ collaboration such as citizen climate juries (Ross et al., 2021) and community-based collectives (Petersen et al., 2006).

EJ councils solicit, from diverse arrays of actors, advice on social, scientific, policy, and other issues related to environmental justice. More specifically, these councils are meant to include low-income and minority stakeholders in the discussion, decision-making, and implementation of policies that have traditionally adversely and disproportionately affected them, aligning with the fundamental foci outlined in the definition of EJ. Fundamentally, EJ councils are charged to address topics related to: climate change planning, disaster management, reduction of pollution in overburdened communities, equitable conservation and public land use, clean energy transitions, sustainable infrastructure, and civil rights. In doing so, EJ councils are intended to support



diverse representation in information sharing in an attempt to facilitate collective decision making and joint problem solving.

Given these specific characteristics of EJ councils, they prove to be an appropriate case in which to evaluate this research for several reasons. First, because EJ councils are mandated through a governing document, the permissions, constraints, and required frequency of meetings are formally identified. From a research design perspective, tracking both actors and conflict over time is easier as the actors are consistently and formally identified, given that the number of council members and positions are established through legislation. Second, they are ideal for studying patterns of conflict within and across meetings given EJ's orientation towards diverse inclusion in knowledge sharing, discussion, and decision-making. While these concepts are important to all collaborative governance arrangements, the orientation of diverse representation is particularly prevalent in EJ council policies, thus one might expect actors to hold diverse perspectives rooted in different knowledge and experiences. Better understanding patterns of conflict is fundamental to better understanding EJ councils and can lend insights about collaborative governance more broadly. In the following section, we offer additional information regarding the selection of the case as well as the methods used to study conflict in EJ councils.

METHODS

Data collection

This study evaluates a single publicly mandated EJ council. This council is mandated at the state-level by the state's legislature. In Fall 2021, when the data for this study was collected, EJ councils were identified through a keyword search through Google's incognito search. Each state was searched with the terms "environmental justice" as well as one of the following: "council", "commission", "advisory board", "task force" or "coalition". Twelve EJ councils established at the state-level were identified, of which four councils were mandated by state legislation. The other eight councils were established by executive order and housed in the Governor's office or by regulation and housed in the state's department of the environment. The legislatively mandated councils were further examined since they offered the clearest documentation of their structure and their activity over time. While the particular council case reported on in this article was selected based on data availability, it features comparable structures and engagement to other publicly mandated state EJ councils with respect to purpose, structure, and duties. The name of the council and its state are not identified in this article to provide anonymity to council members.

The EJ council case can be seen as structurally defined by key aspects of its mandate. The council case is mandated by the state legislature to provide advice to the state government and its agencies regarding environmental justice and related community issues. The mandate requires at least six meetings per year and identifies 20 positions on the council. These positions are made up of appointed citizen members and government agents. The appointed citizen members are made up of two members representing affected communities and 10 members representing various public interests (e.g., non-profits, business, local government, etc.). While the mandate identifies these 10 members should fill various interests, they are not consistently identified to specific interests in the annual reports. As such, they are broadly identified as appointed citizens in this study. The government members are made up of six agency heads or their delegates (i.e., Department of the Environment, Department of Health and Mental Hygiene, Department of Housing and Community Development, Department of Planning, Department of Business and

Economic Development, Department of Transportation), a representative from the state senate, and a representative from the state house. For all 20 members of the council, individual actors holding each of these positions might change over the eight-year study period, but the positions themselves remain consistent. Furthermore, while there are terms formalized in the mandate, position turnover rarely aligns with the four-year term, and there are no term limits for the positions. A 21st actor is included in the analysis as an additional government actor—the staff liaison, who is often present and engaged in the meetings. Finally, the mandate calls for the coordination of all members to achieve the mandated goals of the council.

With the case identified, three types of data were collected. First, the governing document mandating the creation of the council was collected. The mandate identifies the information from the last paragraph, including the number of council members and the required sectoral affiliation of each member (e.g., appointed citizen and government agent). Second, the annual reports for each year since the council was established were collected from the council's website. These documents allowed for the connection of actor names to each member position identified in the mandate for every year included in the study sample. By identifying member names and their positions in the annual report, a link can be made between names observed in the meeting minutes and the sector the actor occupies. Finally, minutes for each council meeting since the council was established were also collected from the council website. The meeting minutes were coded to identify actor attendance and the type of communication in which actors are engaging, as well as the collaborative activity (defined in more detail in the section entitle "Coordination Activities" below) being communicated.

Meeting minute documents were originally collected in either PDF or Word processor format. The case selection was, in part, driven by the completeness of the meeting minutes as well as the consistency in recording over the full study period. While the authors acknowledge the meeting minutes are not a verbatim transcript of communication in the meeting, the consistency and robustness of the meeting minutes as well as their approval in subsequent meetings gives the authors confidence in the data source and its use. The raw meeting minutes were converted to a tabular format using text mining and natural language processing applications in the computer software R as well as through manual processing and checking. This conversion transformed the data from a prose format to a tabular format where each row represented a single statement. A statement, in this study, is defined as an individual sentence captured in the meeting minutes. Thus, larger sections of the meeting minutes associated with a single actor were subdivided into individual statements. This is done as an actor might have differential conflict associated with each statement in a larger section of communication. For example, in a single section of communication, an actor might agree an EJ topic is important in their first statement but disagree with the policy instrument suggested to address it in their second statement. These two statements are stated by the same actor and linked to the same statement recipient but are considered separately. While this example conveys an example of concord and conflict across the two statements, all statements are subdivided in a consistent fashion.

The following information was identified for each statement extracted from the meeting minutes: (1) who made the statement, (2) whether the statement conveyed a form of one-way communication (i.e., announcement) or two-way communication (i.e., discussion with another person, asking of a question, or answering of a question) (Ambrose, 2023; Nabatchi, 2012), (3) who was the recipient of the statement communicated (if the statement was identified as reflecting two-way communication), and (4) a manual coding of the contents of the statements, which aimed to identify the coordination activity for which the individual discussed. When the speaker of the statement was not clear, the assignment of a speaker to the statement was left blank. 96.6%



of statements coded for the council were coded to an actor. A manual process was used to both check computational measures and add additional measures. Furthermore, there are two reasons to focus on two-way communication. First, one-way communication, in the dataset, is often oriented around reporting information to the group, whereas two-way communication focuses on engagement and discussion. As such, conflict largely emerges in two-way communication statements. This is supported by our measures of conflict (particularly Conflict Severity, which is discussed below), identifying a majority of one-way statements to be value neutral. Second, two-way communication represents 74.2% of statements in the dataset, thus, a majority of the data is retained.

Concept measurement

The key variables analyzed in this study, along with their operational measures, are described below. First, the dependent variable, *conflict*, is measured as the count of conflict statements made by an actor in a given meeting (discussed in “Conflict”). Second, two attributes of network *centrality* in communication are measured (discussed in “Centrality measures”): (1) hub scores, which increase as an actor makes more statements to many actors with high authority scores, and (2) authority scores, which increase as actors receive more statements from many different actors. Third, *statement activity* was measured as statements made by the actor and statements received by the actor (discussed in “Coordination activities”). Fourth, *sector* is measured with a dummy variable that reflects whether an actor belongs to a particular sectoral group or not. **Table 1** recaps these variables and their operational definitions, in addition to providing details on their calculations. Finally, in this study, we measure time as months since the first meeting an individual attended. Given this operationalization, all actors' first meeting is identified as time 0 and all subsequent time is the count of months from this point.

Conflict

Once the tabular meeting minutes were manually checked for accuracy, the dataset was reentered into R to calculate the conflict of each statement. The first part of the analysis undertaken for this article focuses on conflict between council members. Thus, all announcements (i.e., instances of one-way communication) are dropped from the dataset as they do not represent a direct link between actors. Using the R package *sentimentr* (Rinker, 2017), the sentiment for each statement was calculated. Compared to other sentiment packages, *sentimentr* has several advantages. Most specifically, *sentimentr* uses weighting from valence shifters, which effectively reverse, increase, and decrease the sentiment of the dictionary words (Naldi, 2019; Rinker, 2017).

Table 2 offers example sentences depicting the effect of these valence shifters through the *sentimentr* package, alongside scores of other prevailing sentiment dictionaries. *bing*, *Afinn*, and *nrc* packages represent a basic counting approach to sentiment. This count-based system loses the nuance of language captured by the *sentimentr* package, as they count the presence of words rather than their use in the sentence. For example, *sentimentr* captures the amplifier “completely” increasing the sentiment score between *example #1* and *example #2*; the negator “not” flipping the sentiment's polarity between *example #1* and *example #3*; and the deamplifier and negator “but” decreasing the sentiment score between *example #1* and *example #4* but again flipping the sentiment's polarity between *example #3* and *example #4*. Within these examples,

TABLE 1 Variables—concept measures, definitions, and calculations.

Concept measured	Definitions	Calculations
<i>Dependent variable</i>		
Count of conflict statements	A measure used to examine the amount of conflict in which an actor engages in a meeting	$\text{Conf}_{it} = \text{number of negative conflict statements}_{it}$ for actor i in meeting t
<i>Independent variables</i>		
Network centrality in the meeting	A network analysis measure used to explore the “influence” (i.e., the centrality) an actor has on the meeting’s discussion	$\text{Hub}_{it} = \text{Hub Score,}$ $\text{Authority}_{it} = \text{Authority Score}$ for actor i in meeting t
Count of total statements made (outdegree ties)	A representation of the level of participation for an actor in a meeting measure as the total number of statements made by that actor to other actors	$\text{Out_degree}_{it} = \sum \text{statements}_{it \rightarrow}$ for actor i in meeting t
Count of total statements received (indegree ties)	A representation of the level of “popularity” for an actor in a meeting measure as the total number of statements made to that actor by other actors	$\text{In_degree}_{it} = \sum \text{statements}_{it \leftarrow}$ for actor i in meeting t
Sector	A binary term denoting the sector of the actor	$\text{Sec}_i = \text{binary 1/0}$ 0 when actor i is an Appointed Citizen 1 when actor i is an Agency Delegate
Time	Time is measured as months since the actor first attended a council meeting, which is identified as 0	
<i>Additional specifications for out degree ties</i>		
Joint informational work	Mechanisms for facilitation stakeholder problem-solving (Ansell et al., 2020; Buuren, 2009)	<i>Knowledge sharing:</i> Statements where knowledge is shared among council members <i>Joint Fact Finding:</i> Statements where external knowledge is shared with or between council member(s) and an external source
Joint relationship building	General processes in collaboration that work to allow constructive dialogue, align stakeholder perspectives and interests, and facilitate joint problem solving (Ansell et al., 2020)	<i>Value alignment:</i> Statements through which members discuss what is important or what topics the council should address. <i>Joint problem solving:</i> Statements through which members discuss what actions should be taken by the Council

TABLE 2 Example sentences and sentiment scores using *sentimentr*.

	Example sentence	sentimentr	bing	Afinn	nrc
1	The proposed policy is perfect	0.335	1	3	1
2	The proposed policy is completely perfect	0.469	1	3	2
3	The proposed policy is not perfect	-0.306	1	3	1
4	The proposed policy is not perfect, but it is still good	0.283	2	6	2
5	The proposed policy is still good	0.306	1	3	1

one can see how the *sentimentr* package more accurately and robustly captures the sentiment when compared to the counting methods of *bing*, *Afinn*, and *nrc*. For this study, the standard dictionary associated with the *sentimentr* package was iteratively refined to better fit the discussion within the data sample. The scores calculated by the *sentimentr* package are constrained between -1 and 1.

While *sentimentr* was used to calculate the magnitude of positive or negative sentiment of two-way communication (i.e., Conflict Severity), additional coding was required. This coding identified the type of conflict (*Conflict Type*) and an integrated measure of *Conflict Type* and *Conflict Severity* (*Conflict Intensity*). *Conflict Type* is coded in trinary terms (-1:0:1), denoting disagreement, neutrality, or agreement with the referenced speaker in the meeting minutes. The referenced speaker is often the prior speaker. However, at times, it is a different actor as statements can reference information and/or a statement that is non-contiguous in the data table (i.e., actors returning to a point made earlier in the conversation). The coding of *Conflict Type* directly interacts with *Conflict Severity* resulting in the measure of *Conflict Intensity*. *Conflict Intensity* can be understood as the magnitude of sentiment calculated through the use of *sentimentr* where the sign aligns with the trinary coding of conflict, as it engages a single actor's sentiment score for a single statement and their level of agreement with the referenced speaker (Table 3).

In Table 4, one can see a practical example of the conflict coding used in this study. When observing the conflict severity column, one can see that *sentimentr* calculated statements #3 and #5 to be positive in sentiment regarding the Act report, whereas statements #4, #6, and #7 are negative in sentiment towards the report. In contrast, conflict intensity represents not the positive, neutral, and negative sentiment value attached to the topic but the relational conflict between actors. For example, in statements #6 and #7 two linked actors make statements negative in conflict severity (i.e., they have negative sentiment towards the Act report), and thus statement #7 has a positive conflict intensity and a positive interpersonal relationship linkage. Furthermore, the sign of conflict intensity is solely related to conflict type. For example, in statement #6, conflict intensity is negative as the speaker conflicts with the linked speaker, whereas in statement #7 conflict intensity is positive as the speaker is in agreement with the linked speaker.

For this study, all measures are made at the meeting-level for each individual present at the meeting. As a result, the dependent variable, the count of conflict statements, represents the count of all statements with a *Conflict Intensity* score less than zero made by an actor in a meeting. Likewise, the independent variables Count of Total Statements Made (i.e., outdegree ties)

TABLE 3 Key definitions and operationalizations.

Term	Definition	Operationalization
Conflict type	The assessment of agreement, neutrality, and disagreement as coded in a two-way communication statement linking the speaker and a referenced speaker	Trinary code denoting disagreement (-1), neutrality (0), or agreement (1)
Conflict severity	The magnitude of positive or negative sentiment within a two-way communication statement	Assessed through a refined <i>sentimentr</i> model (continuous from -1 to 1)
Conflict intensity	The integration of both the conflict type and conflict severity resulting in both the direction of conflict (i.e., agreement, neutrality, and disagreement) and the magnitude of sentiment	Magnitude: Conflict Severity (-1 to 1) Polarity: Conflict Type (denoting disagreement {-1}, neutrality {0}, or agreement {1})

and Count of Total Statements Received (i.e., indegree ties) are calculated for each actor at each meeting. Finally, all actors who attended a respective meeting but made no two-way communication statements are added back into the dataset and are represented with zeros across all calculated measures.

Centrality measures

Eigen centrality is a measure of the influence an actor has on the network. In this way, communication with other actors who have greater amounts of communication themselves is given greater weight than communication with actors who communicate less (Borgatti et al., 2022). Thus, Eigen centrality considers both how many other actors to which an actor is connected as well as how connected these other actors are. Eigen centrality can be calculated as:

$$C_E(v_{it}) = \frac{1}{\lambda} \sum_{j_t \in M(v_{it})} x_{jt}$$

where λ is a non-zero Eigenvalue which maximizes the results of the centrality measure, x_{jt} is the centrality measure of actor j in meeting t , and $M(v_{it})$ is the set of neighboring vertices for vertex, v , which represents actor i in meeting t . Given $\frac{1}{\lambda}$ in the Eigen centrality equation, all scores are bound by 0 and 1.

Hub and authority scores are generalizations of the Eigen centrality scores, which emphasize to whom and how the vector is connected (Borgatti et al., 2022; Csardi, 2013). Each actor receives both a hub and authority score. An actor with a high hub score makes more statements to many actors with high authority scores. An actor with a high authority score receives statements from many different actors. [Figure 1](#) works to more clearly translate the hub and authority scores from their respective networks. As one can see, the left panel of [Figure 1](#) offers four network maps. The right panel offers both the hub and authority scores for each node in each of the network maps. A node, which represents an individual actor at the meetings in this study, is represented

TABLE 4 Practical example of conflict coding.

Participant name	Other participant referenced	Statements	Conflict		
			Conflict type	Conflict severity	Conflict intensity
1	Part. #1	The Vice Chair of the commission gave an overview of the Executive Summary of the report introducing all of the stakeholders involved in the report	0	0.000	0.000
2	Part. #2	Part. #1 The question was asked why is this report coming to the commission?	0	0.000	0.000
3	Part. #1	Part. #2 Said because stakeholders have ask the council for advise and recommendations on how to integrate environmental justice and equity into their consideration for the Act, and the report helps do that	0	0.200	0.000
4	Part. #2	Part. #1 Said the report was way too long and lengthy	-1	-0.472	-0.0472
5	Part. #1	Part. #2 The strategies in the Act are good for the community and could create about 37,000 jobs by 2020	0	0.390	0.000
6	Part. #2	Part. #1 I disagree. The fact of the matter is jobs will be created but how do we get them to the folks that are systematically are under unemployed and the people who transitioning from extracted industries get other jobs	-1	-0.739	-0.739
7	Part. #3	Part. #2 These recommendations don't make sure that we aren't displacing people to really creating opportunities in this new green economy and it's only going to happen if we are thoughtful and sit down with our stakeholders and think about how that could happen	1	-0.377	0.377

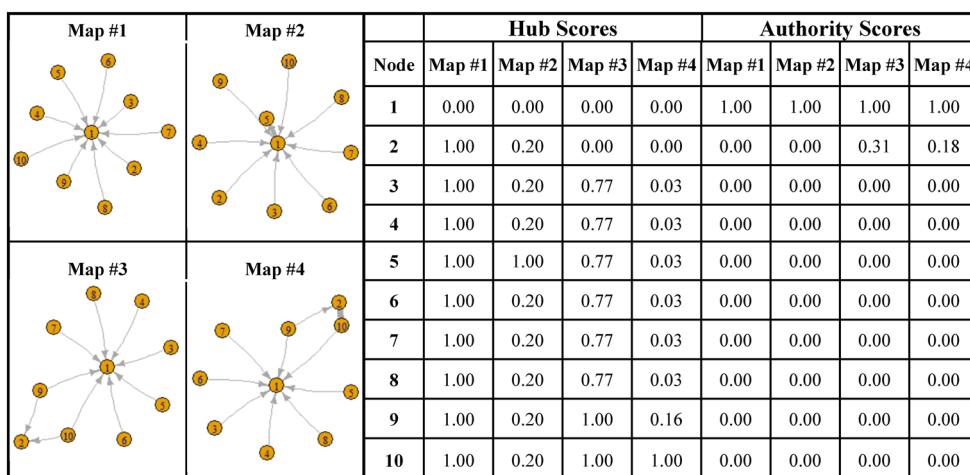


FIGURE 1 Hub score and authority score examples and respective networks.

by corresponding numbers between the two panels. Furthermore, each of the connecting ties is directional, meaning that the information, as in this study, is communicated from one node to another. As one can see in network map #1, node #2 through node #10 are making a statement to node #1. In this way, all information is directionally flowing to node #1, and, as a result, node #1 has an authority score of 1.00, while all other nodes have an authority score of 0.00. Furthermore, because all nodes are equally connected to node #1 (all have a weight of 1.0 or have made one statement), they all received a hub score of 1.00. Because node #1 has made no statements, it receives a hub score of 0.00. To examine the influence of multiple statements on hub score, network map #2 has the same structure of network map #1, but node #5 has made five statements to node #1. While the authority score has not changed, as all information still flows to node #1, this has influenced the hub scores. More specifically, because node #5 is more connected to the high authority actor (i.e., node #1), node #5's hub score remains 1.00 while other nodes fall to 0.20. In this way, hub scores increase relatively as actors make more statements to central authority actors.

To examine the influences on authority scores, network map #3 of Figure 1 represents two “authority actors”—node #1 and node #2. While node #1 maintains the same number of ties received, node #2 now receives two ties of its own. In this way, node #1 retains its authority score of 1.0, but now node #2 has an authority score of 0.31. Finally, to emphasize the orientation of authority score to the number of connections to other nodes rather than the number of statements made, in network map #4, node #1 and node #2 receive the same number of statements, i.e., eight. While node #1 receives one statement from eight different actors, node #2 receives one statement from node #9 and seven statements from node #10. Thus, when comparing the authority score results in network maps #3 and #4, one can see that node #1 remains 1.00 but node #2 actually pays a penalty in network map #4 when the statements are concentrated from one actor. In this way, higher authority scores are not tied merely to more statements being made to an actor but, rather, many statements made by many different actors.

Hubs scores and authority scores emphasize different attributes of information sharing calculated by Eigen centrality. Practically, we might imagine a network of actors asking and answering questions. An actor with a high hub score represents someone who is asking many questions to central actors in the meeting's communication network. In this way, a high hub score might be



seen as indicative of an actor who is working to accumulate information from many different authority sources. In contrast, an actor with a high authority score is being asked questions by many other people. In this way, they are the authority on the topic and disseminate information to the other actors. The use of hub and authority scores can be seen as a different operationalization of the dynamic outlined by Innes and Gruber (2005). More specifically, high hub scores might be seen as people frequently asking questions or challenging authority figures (i.e., citizen actors), whereas high authority scores might be seen as the authority actors defending their dominant positions (i.e., technical bureaucrats). Since these scores are constructed from Eigen centrality, they are also bound between 0 and 1, with higher scores indicating higher levels of hub and authority positions in communication networks.

Coordination activities

In addition to evaluating the association between participation through communication and the number of conflict statements made by an actor in a meeting, we are also interested in exploring an actor's statement activity, measured as statements made by the actor and statements received by the actor. Furthermore, in this study, we work to extend an actor's statement activity to better understand the influence of what the actor is discussing and the number of conflict statements. More specifically, we conceptualize this more nuanced coding as the type of coordination in which the actor is engaging. This conceptualization focuses not only on whether an actor speaks but also on what they are expressing. Here, we particularly account for two coordination types drawing on Ansell et al.'s (2020) characterization of each: (1) joint informational activity (i.e., knowledge sharing and joint fact finding) and (2) joint relationship building activity (i.e., value alignment and joint problem solving) (Ansell et al., 2020; Buuren, 2009). Knowledge sharing is defined as the sharing of knowledge among council members, whereas joint fact finding is defined as the sharing of knowledge originating from external actors to council members. Value alignment is defined as a coordination activity in which members define what they deem important or what topics the council should address. Joint problem solving is defined as a coordination activity in which members negotiate what actions the council should undertake.

Analytical approach: Hurdle poisson mixed effects model

The variables and according data are analyzed using a two-part, poisson mixed effects hurdle model. Figure 2 depicts the distribution of conflict statements across the data sample and identifies the need for using this modeling strategy. As one can see across the full sample, i.e., "All Actors" in Figure 2, across the sample split between the sectors of the actors and the distributions of each individual actor included in the data set, the count of conflict statements made by each actor in each meeting follows a distinct poisson distribution where the distribution clusters near zero and one and is skewed right. Additionally, because the distribution is particularly clustered at zero, we utilize a zero-part first stage model that models the probability of a zero-count outcome. The splitting of the zero-part model from the passion count model allows for a more accurate estimate of the passion count model, as the estimates are not inflated or deflated based on the zero count observations.

Figure 3 identifies more specifically the analytical approach of the article given the two-part, poisson mixed effects hurdle model. One can see the two parts of the analytical approach: (1) the zero-part probit model and (2) the count-part poisson mixed effects model. Conceptually, one can think

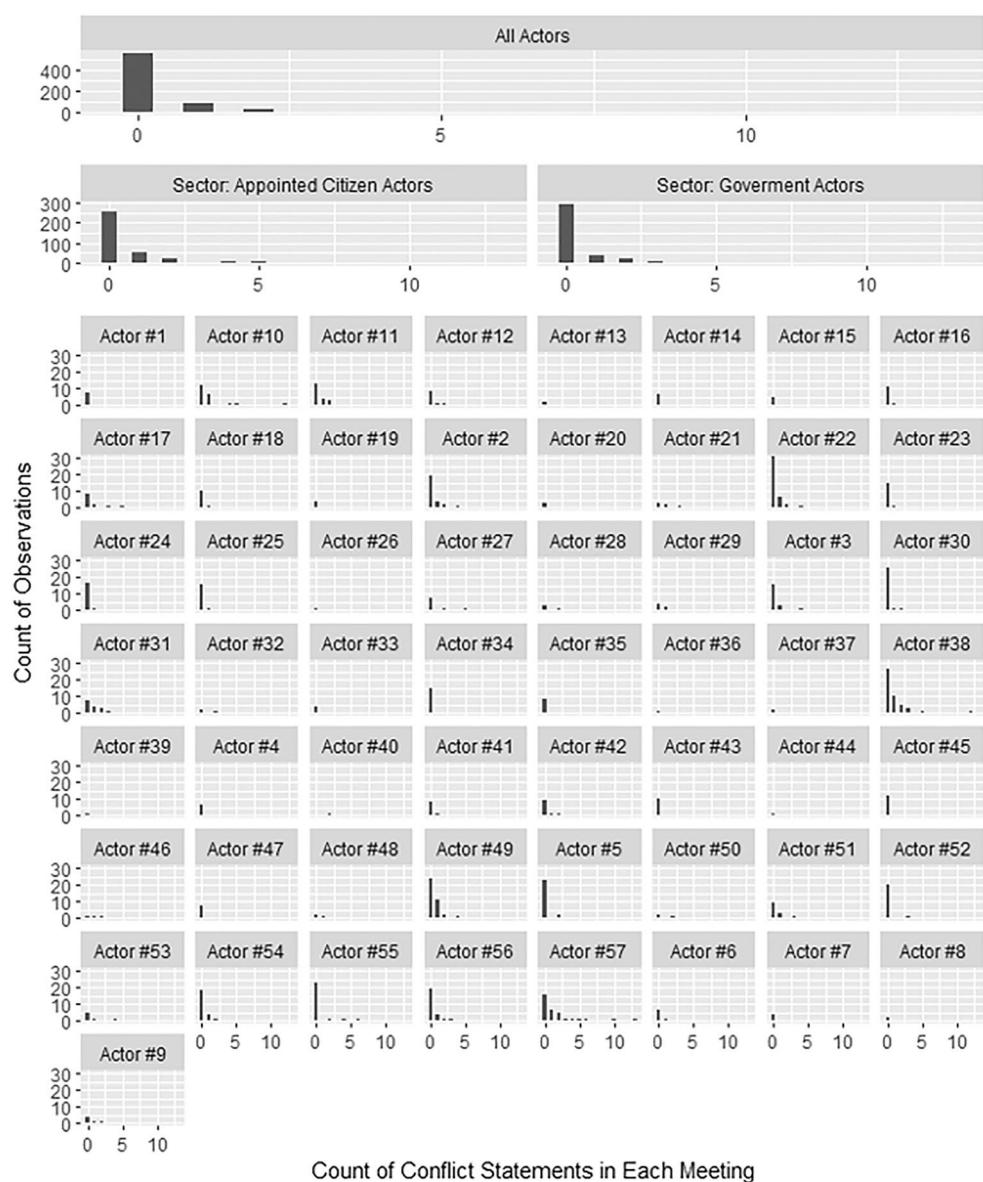


FIGURE 2 Distribution of conflict statements aggregated by all actors, sector groups, and individual actors. The same study sample ($n=696$) is presented three times given different aggregations and the representative distributions: (1) all actors in the sample, (2) across an actor's sector (i.e., appointed citizens and government actors), and across each individual actor.

of the zero-part as judging whether conflict statements occur in the observation, and the count-part as how many conflict statements are observed when conflict statements are observed. More specifically, the zero-part of the model can be interpreted as the likelihood of a zero-conflict-statement observation, such that a positive estimate is associated with a greater chance of a zero outcome and a negative estimate is associated with a greater chance of having at least one conflict statement.

In the zero-part and the count-part of the model, time and sector are included in the model, along with the count of total statements made by the actor, the count of total statements received by the actor, as well as their hub score and authority score given their position in the meeting's

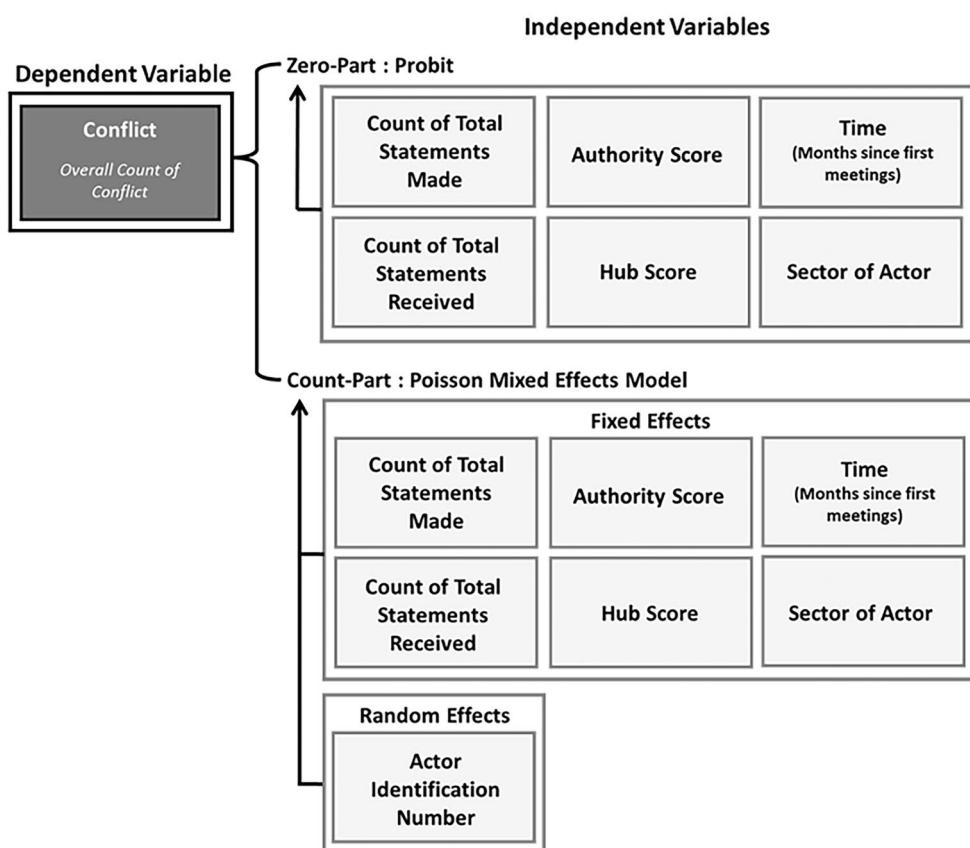


FIGURE 3 Analytical model.

communication network. Time is operationalized as months since the actor's first meeting attended, and the actor's sector is a dummy variable which is 0 if the actor is an appointed citizen and 1 if the actor is a government actor. While the total count of statements made, and statements received are meant to represent the robustness of the actor's activity in the meeting—acknowledging actors have differing baselines for engaging in the collaboration overall, hub and authority scores are included in the model to examine the association between their position in the communication network and their count of conflict statements. In this way, our aim is not to associate merely more statements communicated with more conflict statements (e.g., count of statements made and received), but rather to assess how actors are engaging and the extent of conflict exhibited in their communication. Furthermore, a random intercept is modeled for each actor in the count-part model. This is done to control for inherent actor specific variation due to their dispositions for speaking and conflict.

More specifically the hurdle poisson mixed effects model is structured as follows. First, the hurdle portion is examined via,

$$Pr(Y = j) = \begin{cases} f_1(0) = w, & j = 0, \\ \frac{1-f_1(0)}{1-f_2(0)} f_2(j), & j > 0, \end{cases}$$

where j represents the observed count of conflict statements, $f_1(y)$ and $f_2(y)$ are density functions for the first process and second process of the model, respectively, and $f_1(0) = w$ is the probability that zero conflict statements are observed, whereas $\frac{1-f_1(0)}{1-f_2(0)}$ represents the inverse value representing the probability of one or more conflict statements. In this way, the observations passed on to the poisson model are truncated to the non-zero observations. Furthermore, with the second process in a zero-truncated generalized poisson distribution, the following generalized hurdle poisson model can be estimated,

$$Pr(Y = j) = \begin{cases} w, & j = 0, \\ (1-w)\frac{g}{1-g(0)}, & j > 0, \end{cases}$$

where w represents the probability of zero conflict statements as calculated in the zero-part estimation, and g represents a generalized poisson model weighted by the moments of non-zero observation (Zou et al., 2021).

RESULTS

Basic hurdle models

Table 5 presents the results of the two-part, poisson mixed effects hurdle model as each variable represented in the conceptual model is added individually. First, Model 1 presents the most basic model, a dummy variable for the sector and the time variable is included in the fixed effects portion (or count-part) of the model and the zero-part of the model. As one can see, only the intercept in the zero-part of the model is statistically significant ($\beta=1.771, p<.001$). In the fixed effects model, the estimated effect of the time variable on conflict statements was not statistically significant ($\beta=-0.008, p=.096$). Similarly, the number of conflict statements made by participants was not statistically different between government actors and appointed agents ($\beta=-.085, p=.766$).

In Model 2, the number of in-degree and out-degree ties are added for each actor in each meeting. The intercept in the zero-part of the model remains statistically significant but increases in magnitude ($\beta=2.657, p<.001$). Furthermore, the estimate for out-degree statements is highly significant in the zero-part ($\beta=-0.402, p<.001$), suggesting actors are more likely to make at least one conflict statement when they make a greater number of total statements. In the count-part, fixed effects portion of the Model 2, the number of out-degree statements made by an actor is also statistically significant, thus one additional statement made by an actor in a meeting would be expected to increase the logs of expected counts of conflict statements by 0.084 ($p<.001$).

In Model 3, an actor's hub score and authority score given their position in the communication network of each meeting replaces the number of in-degree and out-degree ties for each actor in each meeting. Both hub score and authority score are statistically significant in both the zero-part and the count-part of the model. Given the results of the zero-part of the model, as the hub score ($\beta=-1.997, p<.001$) and the authority score ($\beta=-0.800, p=.009$) increase, we would expect a decreased likelihood of a zero conflict outcome. For a one-unit change in the hub score in the count-part of the model, differences in the logs of expected counts of conflict statements would be expected to increase by 0.911 ($p<.001$). Similarly, a higher authority score increased the logs of expected counts of conflict statements ($\beta=0.612, p=.004$).



TABLE 5 Two-part, poisson mixed effects model.

	(1)	(2)	(3)	(4)
<i>Zero-part</i>				
Intercept	1.771***	2.657***	2.113***	2.658***
Sector (Gov.)	0.093	0.233	0.143	0.243
Time (months)	-0.008	-0.008	-0.006	-0.008
Out-degree		-0.402***		-0.344***
In-degree		-0.015		-0.062
Hub score			-1.997***	-0.574
Authority score			-0.800**	0.352
<i>Fixed effects</i>				
Intercept	0.284	-0.709**	-0.250	-0.856**
Sector (Gov.)	-0.085	0.224	-0.098	0.230
Time (months)	-0.008	0.001	-0.004	0.001
Out-degree		0.084***		0.058***
In-degree		0.017		0.041**
Hub score			0.911***	0.588*
Authority score			0.612**	-0.303
<i>Fit</i>				
Log link	-580.9	-429.6	-536.9	-425.3
AIC	1179.9	885.3	1099.8	884.5
BIC	1198.3	911.9	1126.4	919.2

p*-values <.05; *p*-values <.01; ****p*-values <.001.

Finally, Model 4 presents the most robust basic two-part, poisson mixed effects model. It includes all variables captured in the conceptual model and discussed thus far. The results of the zero-part of Model 4 show only the intercept ($\beta = 2.658$, $p < .001$) and out-degree statements ($\beta = -0.344$, $p < .001$) as statistically significant, where hub score ($p = 0.188$) and authority score ($p = 0.471$) are no longer statistically significant. For the count-part, fixed effects portion of Model 4, one can see that out-degree ($\beta = 0.058$, $p < .001$), in-degree ($\beta = 0.041$, $p = 0.006$), and hub score ($\beta = 0.588$, $p = .016$) are statistically significant with positive relationships with the count of conflict statements. In other words, actors are expected to make more conflict statements as they: (1) make more statements to other participants (out-degree), (2) receive more statements from other participants (in-degree), and (3) make more statements to actors with high authority scores (hub score). Furthermore, of the four poisson hurdle models, Model 4 is found to be the best fit for the sample data as the Log Link and AIC values (Log Link = -425.3; AIC = 884.5) are the lowest across the models.

Supplementary hurdle models

Table 6 further explores the results presented in Model 4 of Table 5. As one can see, Model 4 is again reported—here in the first results column. Model 5, Model 6, and Model 7 represent different interaction models engaging different variations of hub score, time, and sector variables.

TABLE 6 Supplementary poisson hurdle models.

	(4)	(5)	(6)	(7)
<i>Zero-part</i>				
Intercept	2.658***	2.973***	2.953***	2.594***
Sector (Gov.)	0.243	-0.394	0.234	0.360
Time (months)	-0.008	-0.018**	-0.018**	-0.008
Out-degree	-0.344***	-0.346***	-0.336***	-0.339***
In-degree	-0.062	-0.075	-0.057	-0.060
Hub score	-0.574	-0.563	-2.099**	-0.303
Authority score	0.352	0.374	0.255	0.299
Time (months)*Sector (Gov.)		0.025*		
Hub Score*Time (Months)			0.049**	
Hub Score*Sector (Gov.)				-0.561
<i>Fixed effects</i>				
Intercept	-0.856**	-0.732*	-0.805*	-1.084**
Sector (Gov.)	0.230	-0.020	0.230	0.678*
Time (months)	0.001	-0.004	-0.001	0.001
Out-degree	0.058***	0.063***	0.057**	0.046**
In-degree	0.041**	0.037*	0.041**	0.050**
Hub score	0.588*	0.540*	0.486*	1.056**
Authority score	-0.303	-0.338	-0.292	-0.329
Time (months)*Sector (Gov.)		0.010		
Hub score*Time (months)			0.033	
Hub score*Sector (Gov.)				-0.897*
<i>Fit</i>				
Log link	-425.3	-422.2	-420.1	-422.9
AIC	884.5	882.3	878.1	883.7
BIC	919.2	921.1	916.9	922.6

*p-values <.05; **p-values <.01; ***p-values <.001.

Interestingly, each of these models shows the interaction terms are significant in either the zero-part or the count-part, but not both. Model 5 and Model 6 offer significant estimates for time and sector ($\beta = 0.025, p = .023$) and hub score and time ($\beta = 0.049, p = 0.002$), respectively, in the zero-part of the models. Additionally, in Model 5 and Model 6, the time component in the zero-part is also statistically significant (Model 5: $\beta = -0.018, p = 0.007$; Model 6: $\beta = -0.018, p = 0.003$).

Figure 4 depicts the interaction relationship presented in Model 5. In this case, the high, median, and low values for time (i.e., number of months since the actor first attended) were calculated utilizing the sample, where low values are the first quintile and high values are the fifth quintile. Using means-centered pairwise comparisons, only the estimates for Appointed Citizens are statistically different across time values ($p = .048$). There is no significant impact of the time variable for Government Actors ($p = .957$). This suggests the sector of actors moderates the association between time and the increased likelihood of having at least one conflict statement, or, in

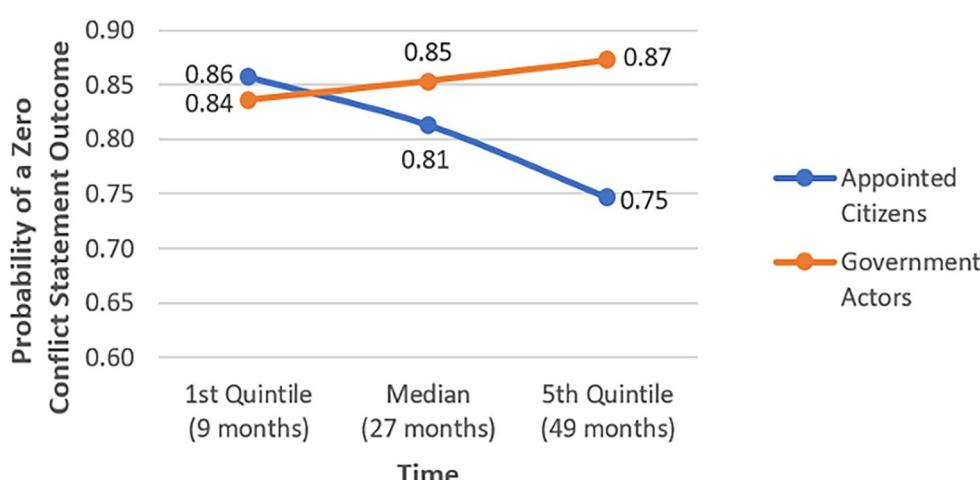


FIGURE 4 Probability of a zero conflict statement outcome given low, mean, and high time and sector (Model 5). High and low values for time (i.e., number of months since the actor first attended) were calculated utilizing the sample, where low values are the first quintile and high values are the fifth quintile.

TABLE 7 Marginal effects hub score across sectors.

Variable	Est.	SE	p-value
Government actors	0.003	0.540	.996
Appointed citizens	1.205**	0.466	.009

*p-values <.05; **p-values <.01; ***p-values <.001.

practical terms, appointed citizens are more likely to make at least one conflict statement as they attend the council longer.

Model 7 features an interaction term between sector and hub score. We can see that both the hub score estimate as well as the interacted sector-hub score estimate are statistically significant in the count-part of the model. Interestingly, the hub score estimate is positive ($\beta = 1.056$, $p = .008$) and the interacted term is negative ($\beta = -0.897$, $p = .035$). This relationship is explored and presented in Table 7 and Figure 5.

Table 7 depicts the marginal effects of Government Actors and Appointed Citizens, given the results of Model 7, where all other variables were evaluated based on the sample centered means. As one can see, Government Actors are represented by a statistically insignificant marginal effect for hub score ($p = .996$), whereas Appointed Citizens are represented by a statistically significant and large marginal effect for hub score ($\beta = 1.205$, $p = .009$). This suggests that the sector of the individual moderates the association between an actor's hub score and the number of conflict statements. While hub score is important for the number of conflict statements made by Appointed Citizens, hub score is not important for Government Actors. This same relationship is depicted in Figure 5, where the hub score is calculated for Government Actors and Appointed Citizens as a low value (the 1st quintile), median value, and a high value (the 5th quintile).

The final two models of Table 8, i.e., Model 8 and Model 9, offer a more nuanced conceptualization of actor activity. More specifically, this conceptualization categorizes the number of out-degree ties into the type of coordination activities which an actor is discussing. First, it is noteworthy that estimates of these two models keep similar statistical significance and magnitudes

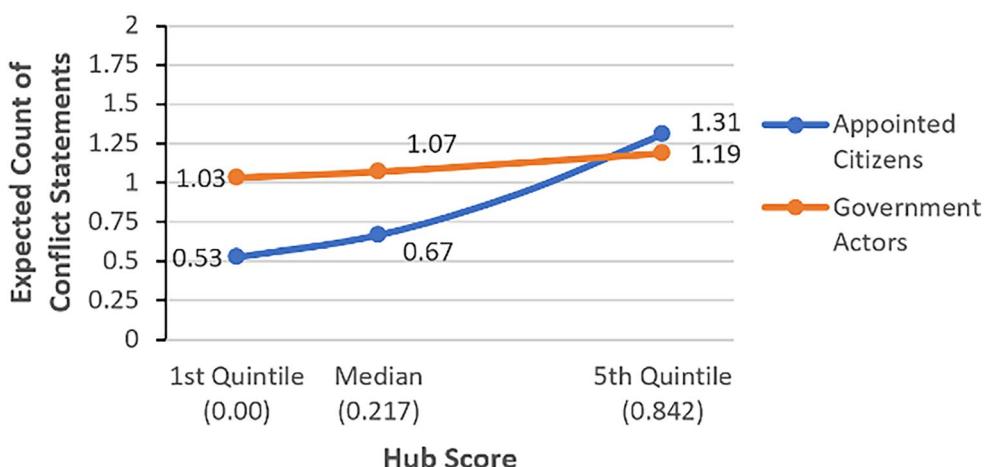


FIGURE 5 Expected count of conflict statements given low, mean, and high hub scores and sector of actors (Model 7). High and low values for hub score were calculated utilizing quintile of the sample, where low values are the first quintile and high values are the fifth quintile.

of estimates across intercept, in-degree ties, hub score, and a sector-hub score interaction (Model 8 is comparable to Model 4, whereas Model 9 is comparable to Model 7). Additionally, because we are further subdividing the measurement of our independent variable of interest given this conceptualization, we consider the estimates at a p-value threshold of 0.1.

In Model 8, one can see in the zero-part of the model that an increase in statements coded as Knowledge Sharing ($\beta = -0.447, p < .001$), Value Alignment ($\beta = -0.479, p < .001$), and Joint Problem Solving ($\beta = -0.416, p < .001$) result in a decrease in the likelihood of a zero conflict outcome. Interestingly, one sees that Joint Fact Finding statements are the only non-significant out-degree statement type in the zero-part. Moving to the count-part of Model 7, both increases in statements coded to Value Alignment ($\beta = 0.048, p = .064$) and Joint Problem Solving ($\beta = 0.071, p = .008$) are associated with logs of the expected increase in the number of conflict statements made by the actor; yet both Joint Fact Finding ($p = .632$) and Knowledge Sharing ($p = .529$) are statistically insignificant. In Model 9, the interaction term between sector and hub score is added to the model, which proves to be statistically significant and negative in magnitude. Furthermore, each of the four out-degree statement types maintains a similar magnitude and significance to Model 8.

DISCUSSION

Pattern of conflict over time

Despite the theoretical, empirical, and practical interests in better understanding the influence of diversity in collaborative fora, very little empirical work has focused on a concomitant outcome of such actor diversity—conflict. Furthermore, often discussed theoretically (Emerson & Nabatchi, 2015; Ostrom, 1990) or qualitatively (Innes & Booher, 2003), collaborative fora are often presented as places where diverse actors with conflicting interests are able to learn from each other and work together towards some common end (Doberstein, 2016; Leach et al., 2014; Muro & Jeffrey, 2006; Resh et al., 2014). Yet, how conflict is associated with this process is limited

**TABLE 8** Coordination Activities Supplementary poisson hurdle models.

	(4)	(8)	(9)
<i>Zero-part</i>			
Intercept	2.658***	3.012***	2.935***
Sector (Gov.)	0.243	-0.018	0.121
Time (months)	-0.008	-0.009	-0.009
Out-Degree	-0.344***		
Out-D: Joint fact finding		-0.121	-0.118
Out-D: Knowledge sharing		-0.447***	-0.438***
Out-D: Value alignment		-0.479***	-0.475***
Out-D: Joint problem solving		-0.416***	-0.421***
In-degree	-0.062	-0.150**	-0.144**
Hub score	-0.574	-0.852*	-0.494
Authority score	0.352	0.830	0.770
Hub score*Sector (Gov.)			-0.701
<i>Fixed effects</i>			
Intercept	-0.856**	-1.006**	-1.199***
Sector (Gov.)	0.230	0.414	0.802*
Time (months)	0.001	0.002	0.002
Out-degree	0.058***		
Out-D: Joint fact finding		0.029	0.020
Out-D: Knowledge sharing		-0.021	-0.021
Out-D: Value alignment		0.048 ^Φ	0.041 ^Φ
Out-D: Joint problem solving		0.071**	0.055*
In-degree	0.041**	0.056**	0.064***
Hub score	0.588*	0.873***	1.279***
Authority score	-0.303	-0.319	-0.363
Hub score*Sector (Gov.)			-0.851*
<i>Fit</i>			
Log link	-425.3	-410.1	-407.9
AIC	884.5	866.2	865.9
BIC	919.2	913.2	917.0

^Φp-values <.1;

*p-values <.05; **p-values <.01; ***p-values <.001.

(Ulibarri, 2023). Scholars suggest that collaborative governance helps reduce conflicts over time by building consensus (Ansell & Gash, 2008; Bryson et al., 2006; Emerson & Nabatchi, 2015; Ostrom, 1990); leads to further entrenchment and growth in conflict (Jenkins-Smith & Sabatier, 1993; Koebele & Crow, 2023; Weible, 2008); and has mixed influences with the ability to both increase and decrease conflict (Lubell et al., 2017, 2020; Ulibarri, 2023). Thus, literature offers many competing propositions as to the temporal pattern of conflict in collaborative groups.

The results of this article do not support a clear temporal pattern of conflict. Across all nine models presented, the temporal variable, operationalized as months since the actor's first attended

meeting, and its associated interaction terms proved to be statistically insignificant in the counterpart of the model, meaning an actor's continued engagement is not associated with a consistent increase or decrease in the count of conflict statements over time. Furthermore, when different specifications for time were used (i.e., an ordinal count of meetings an actor had attended and a count of meetings since the first meeting an actor attended), both the significance of the estimate as well the fit of the overall model became worse.

While literature broadly suggests a pattern of conflict (either high to low or low to high over time), it is unsurprising the results here do not support this pattern. Since the unit of analysis for this study is the individual actor at the meeting level, the measurement of conflict may be too coarse, as conflict might be seen as changing dynamically across topics of discussion within a meeting in addition to its dynamic change across meetings. While the results capture the temporal trends of "if conflict occurs" and "how much conflict is observed", it is unable to link conflict to specific topics as they ebb and flow over time. In other words, conflict is often linked to specific relationships, processes, or tasks (Jehn, 1995; Jehn & Mannix, 2001)—a dynamic that is not captured in this analysis.

While further empirical work is needed to explore more granularly conflict emergence and subsidence in collaborative fora over time, theory offers glimpses into the cyclical and dynamic nature of conflict. First, emerging conceptualizations of conflict in the policy process (Ambrose & Siddiki, 2024; Siddiki & Ambrose, 2023; Weible & Heikkila, 2017) identify the ebbs and flows of conflict and communication as multi-topic collaborative fora move from deliberating one topic to another. In a growing body of policy process literature (Ambrose & Siddiki, 2024; Vantaggiato & Lubell, 2022; Weible & Heikkila, 2017), scholars recognize that conflict is cyclical as differences are identified, resolved, and new differences around new topics are identified (Pondy, 1967). As a result, it might be expected that the trend of conflict frequency can be observed at a coarse level (i.e., observing one or more conflict statements in a meeting), but the level of conflict (i.e., counts of conflict statements) is more difficult to observe as it increases and decreases across and even within meetings as topics resolve and emerge.

Association between sectoral backgrounds and conflict

Theory suggests that different types of actors engage in different ways (Innes & Booher, 2003; Jenkins-Smith et al., 2014; Sabatier, 2007). Particularly, actors with different forms of knowledge are expected to act differently, as technical experts or information authorities view their information as value neutral and unbiased while non-technical advocates are expected to challenge this information (Innes & Booher, 2003; Innes & Gruber, 2005; Sabatier, 2007). Thus, citizen actors might be seen as more conflictual, as they aim to challenge the technical information and traditional approaches of bureaucratic actors, whereas bureaucratic actors are expected to be less conflictual, as they leverage the "technically right answers" that they see as value neutral. The results suggest that there are weak differences in conflict outcomes between government actors and appointed citizen actors, and these differences are nuanced—associated with the actor's time in the council.

First, in Model 5, an actor's sector becomes significant when interacted with time. Model 5 suggests that, when attending more meetings, appointed citizens are more likely to make at least one conflict statement in a meeting, whereas for government actors, the association between time and making at least one conflict statement is insignificant. This suggested that an actor's sector moderates the association between time and making at least one conflict statement in a



meeting. Yet, there is a clear disconnect between engaging in conflict more often (i.e., Model 5's zero-part) and engaging in a greater amount of conflict (i.e., Model 5's count-part), as the interaction between sector and time is not significant in the count portion of the model. Stated differently, appointed citizens are more likely to engage in conflict over time but not increasing counts of conflict over time. In practical terms, this means that appointed citizens are 11% more likely to engage in some conflict when comparing their activity in month 9 to month 49 of their membership. While this represents a statistically significant result, it only offers weak support for the expectation that appointed citizens will be more conflictual as they challenge authority members in the study venue.

Actor attributes and conflict

While there is only weak support linking greater amounts of conflict and appointed citizens, the study uses hub and authority scores as an alternative operationalization of the dynamic outlined by Innes and Gruber (2005). More specifically, high hub scores might be seen as people frequently asking questions or challenging authority figures, whereas high authority scores might be seen as the authority actors defending their dominant positions. In this way, the measures are more closely linked to the actions expected to increase conflict rather than the sector itself.

The results of Model 4's count-part suggest only the hub score is statistically significant in its association with counts of conflict statements ($\beta=0.588, p=.016$), whereas the estimate of authority score does not prove to be statistically significant. This suggests a specific pattern of conflict that reflects the "challenging authority" dynamic presented by Innes and Gruber (2005). Particularly, those who are making more statements to "authority" actors are more likely to make conflict statements. In contrast, there is no association between being an "authority" actor and changes in conflict statements. This broadly suggests that those engaging with authority actors or knowledge experts are more likely to be conflictual than those knowledge experts. While these results must be explored further, they support the idea that non-technical advocates challenge information from authority figures or technical experts, while technical experts engage in less conflict as they see their role more narrowly as informative, technical, and regulatory experts (Innes & Booher, 2003; Innes & Gruber, 2005; Leach, 2006; Sabatier, 2007; Weible et al., 2004). Given this broad evidence for the "challenging authority" dynamic, a more nuanced examination could be explored.

In the count-part of Model 7, both the hub score estimates and the interaction of sector and hub score are statistically significant. Interestingly, the hub score estimate is positive ($\beta=1.056, p=.008$) and the interacted term is negative ($\beta=-0.897, p=.035$), suggesting the number of conflict statements made by appointed citizens (the 0 variable in the sector dummy) has a greater association between their hub score and their expected count of conflict statements than their government counterparts. Furthermore, Figure 4 shows that the number of conflict statements made by appointed citizens is expected to increase as their hub score increases. However, this positive association was not statistically significant among government actors. Thus, only appointed citizens who engage with authority actors at increased levels have greater amounts of conflict. This offers nuanced support to the expectation of citizens being more conflictual as they challenge authority, as it is both their sector and their activity that is important to understanding conflict (Innes & Booher, 2003; Innes & Gruber, 2005). Thus, the results suggest that citizens are engaging in conflict variably. Appointed citizens who speak with authority actors more frequently are observed to have a greater count of conflict.

Coordination activities and the level of conflict

Finally, this study works to better understand what type of coordination is associated with conflict by extending the measurement of an actor's statement activity. More specifically, we conceptualize this more nuanced coding as the type of coordination leveraging Ansell and colleagues' (2020) characterization of: (1) joint informational activity (i.e., knowledge sharing and joint fact finding) and (2) joint relationship building activity (i.e., value alignment and joint problem solving) (Ansell et al., 2020; Buuren, 2009). While the validity of information might be challenged (Innes & Booher, 2003; Jenkins-Smith & Sabatier, 1993; Weible, 2008), it is suggested that information and knowledge sharing might be a tool for creating shared understanding and mutual compromise, whereas value alignment activities and joint problem-solving activities are often identified as being conflictual, challenging actors' world views and beliefs (Emerson & Nabatchi, 2015; Jenkins-Smith & Sabatier, 1993).

In Model 8, the results of both the zero-part and the count-part of the models prove to be interesting. First, in the zero-part, an increase in Knowledge Sharing ($\beta = -0.447, p < .001$), Value Alignment ($\beta = -0.479, p < .001$), and Joint Problem Solving ($\beta = -0.416, p < .001$) result in an increase in the likelihood of observing some amount of conflict in the meeting. Yet, Joint Fact Finding statements are not statistically significant. In line with the literature (Innes & Booher, 2003; Sabatier, 1987; Weible, 2008), the validity of information seems to be challenged, but results suggest there is a difference between Joint Fact Finding (defined as sharing knowledge from external sources to the collaborations) and Knowledge Sharing (defined as sharing knowledge from collaboration member to collaboration member). This suggests that actors engage in conflict regarding each other's information, while engaging in less conflict with outside actors. This aligns with policy process theory that suggests external, technical experts can be used as tools to build consensus among even entrenched collaborative groups (Jenkins-Smith & Sabatier, 1993; Sabatier, 1987; Weible, 2008).

Additionally, results suggest that a greater likelihood of making at least one conflict statement (zero-part) and a greater count of conflict statements (count-part) is expected when actors make more statements related to joint relationship building activities (i.e., Value Alignment and Joint Problem Solving). These results suggest that joint relationship building activities are more closely associated with increases in conflict statements, whereas there is no statistically significant relationship between joint informational activities and the count of conflict statements. By definition, joint relationship building is a collaborative process which leverages constructive dialogue to align stakeholder perspectives and interests and facilitate joint problem solving (Ansell et al., 2020). In this way, the discovery of actors' interests, concerns, and values; the definition of the collaborative process and larger problems at hand; and the development of mutual understanding across both interests, concerns, values and problem definitions are activities fundamental to joint relationship building, and, thus, might be expected to be associated with conflict (Ansell et al., 2020; Ansell & Gash, 2008; Emerson & Nabatchi, 2015; Ulibarri, 2023). Furthermore, EJ councils, like the one examined as part of this study, convene community liaisons representing environmentally burdened communities, nonprofits, local government, business, etc. Such stakeholders may bring different interests, viewpoints, and resources to the table to advise on the distribution of environmental benefits and burdens within communities. As they do, and as Dobbin (2021) argues, EJ venues can be places where traditionally accepted definitions of who should participate, the scope of the problem, and who has authority to act can be challenged. Altogether, conflict in EJ councils in particular is not only presumed likely but can be also be constructive (Dobbin, 2021; Morrison et al., 2019). While more research is needed, the results



here suggest that joint relationship building activities are more closely associated with conflict than joint informational activities in collaborative fora.

CONCLUSION

From this research on the dynamics of individual conflict in collaborative governance venues, we draw three key findings. First, in this case study, we are unable to observe group-level conflict dynamics over time. Rather, conflict is associated with both sector and activity. Second, while government actors are more consistently likely to engage in greater counts of conflict in a meeting, it is appointed citizens that frequently engage with authority actors in the council that have increased levels of conflict. Thus, both the position and actions of a citizen, not just their mere sector, is important to conflict in this study's collaborative venue (Innes & Booher, 2003; Innes & Gruber, 2005). Third, the coordination activities in which the actor is engaging is also important to the conflict observed in the study council. While theory suggests information sharing might be a contentious issue in collaborative venues (Jenkins-Smith & Sabatier, 1993; Sabatier, 1987; Weible, 2008), the results show conflict is more closely related to value alignment and joint problem solving, consistent with emerging empirical analysis (Ulibarri, 2023) and theory (Ansell et al., 2020; Ansell & Gash, 2008; Emerson & Nabatchi, 2015).

More broadly, the results of this article highlight the importance of understanding the individual actor and their attributes in collaborative governance venues, rather than expecting broad overarching conflict trends. The examination of these individual dynamics has been the focus of group and team dynamics research (Jehn, 1995; Jehn & Mannix, 2001; Pondy, 1967) and has more recently emerged in collaborative governance and policy process literature (Ambrose & Siddiki, 2024; Kim, 2023; Ulibarri, 2023; Vantaggiato & Lubell, 2022; Weible & Heikkila, 2017). Furthermore, while scholarship has often examined the institutions and process of collaborative venues, less attention has been given to how the structure (i.e., composition) of collaborative groups enables challenges to broader political and social system dynamics (Dobbin, 2021; Morrison et al., 2019). On the one hand, collaborative governance encourages diverse participation, which can lead to conflict in itself (Quick & Feldman, 2011; Ulibarri, 2023). On the other hand, stakeholders' expression on conflict may serve to challenge traditional political and social systems. (Dobbin, 2021; Dobbin & Lubell, 2021; Morrison et al., 2019). Along these lines, the results of this study complement EJ scholarship in two important ways. First, while this study does not examine power differences, conflict emerges in patterns consistent with these dynamics (Innes & Booher, 2003; Innes & Gruber, 2005), as citizens are more likely to have at least one conflict statement and their conflict statement count is observed to increase as they engage actors with greater authority, as observed in the council. Second, the greatest amount of individual conflict is observed when actors are discovering actors' interests, defining the problems at hand, and developing mutual concerns (Ansell et al., 2020; Ansell & Gash, 2008; Emerson & Nabatchi, 2015; Ulibarri, 2023); actions which mirror the challenging of participation, scope, and authority identified by Dobbin (2021) as necessary in EJ venues. While the results of this strand of literature are growing, more work is needed to examine its generalizability across collaborative governance venues in other domains, at other levels of governance, and in other countries.

Additionally, there are limitations to this work, which can be pursued in future work. First, the authors acknowledge the single case study design limits the ability to speak to the generalizability of the results presented. While the results presented here complement prior work on

conflict in collaborative governance venues (particularly Koebele & Crow, 2023; Ulibarri, 2023) as well as theory, comparative work is needed. Specifically, work that examines collaborative governance venues in different domains, as well as with different institutional structures (i.e., levels of government, branches of government, levels of authority, and diversity of actors). Each of these institutional decisions is expected to influence who engages in the council and the dynamics between actors that intern may influence conflict (Dobbin et al., 2023; Morrison et al., 2019; Weible, 2008; Weible & Heikkila, 2017). Second, the analysis in this article focuses on the individual level, thus group responses to diversity (i.e., considering the diversity represented by the people at the meeting) are not examined. Future work should complement existing work (Ambrose, 2023) to better explore the association between individual action in response to group dynamics in collaborative governance venues.

Third, the study is limited by the data used—meeting minutes. As such, the results are representative of revealed communication and modeled actions. While the results offer a robust representation of the council, the authors acknowledge that perceptions of conflict are subjective (Weible & Heikkila, 2017). Additionally, environmental justice is rooted in the distribution of power by bringing previously marginalized groups, those that often receive environmental burdens most severely, to the table (Dobbin, 2021; Holifield, 2001; Morrison et al., 2019; Schlosberg, 2004). However, this analysis is unable to examine power directly. For a better understanding of both the perception of conflict and the change of power, complementary qualitative work will be needed.

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DATA AVAILABILITY STATEMENT

The datasets were derived from sources in the public domain: <https://mde.maryland.gov/programs/crossmedia/environmentaljustice/pages/cejsc.aspx>.

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