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Exploring the impact of collaboration processes on policy networks success: a case study of food policy councils

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ABSTRACT

Innovative forms of collaborative governance have evolved to address a diversity of wicked problems. Collaboration processes involved in these forms of governance appear to have a paradoxical nature, where the necessary inclusiveness and diversity of actors may also be important obstacles for a successful collaboration. We apply theories of collaborative and network governance, and fuzzy-set Qualitative Comparative Analysis, to explore the impact of collaboration process characteristics (network density, diversity, inclusion and participation) on 12 food policy councils. Our findings suggest that collaborative arrangements where diverse stakeholders have equal and inclusive access to active deliberation constitute one path to effective outcomes.

KEYWORDS Collaborative governance; collaborative process; collaborative performance; food policy councils; local food systems

Introduction

Collaborative approaches to address public management and policy problems have a long tradition within the public administration scholarship and practice (Bardach 1998; Gray 1989; McCaffrey, Faerman, and Hart 1995). The importance of such collaborative approaches has only increased over time, mainly because of the increasing complexity of the problems that contemporary public administrators and policymakers face, and have become abundant in the recent public administration literature, from investigations of climate change (Biesbroek and Candel 2020; Boswell, Dean, and Smith 2023), and public health (Tulenko and Vervoort 2020; Wolf-Fordham 2020), to economic development (Lee and Lee 2022; Shrestha 2022) and food security (Akbar et al. 2022; Clark and Jablonski 2022). Unfortunately, despite this expansive research, scholars conclude that working together is not sufficient to improve the policy system, and considering that collaborative approaches face many challenges, results from collaborations are uneven at best (Bianchi, Nasi, and Rivenbark 2021; Huxham et al.

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2000; Yuan et al. 2022). In fact, prior research suggests that procedural characteristics may be characterized as self-contradictory or 'paradoxical' in nature, indicating that the required components for a productive collaboration may also create challenges for collaborative performance (e.g. Connelly, Zhang, and Faerman 2008; Saz-Carranza and Ospina 2011; Vangen 2017; Vangen and Winchester 2014).

Although there is no complete agreement on terms and definitions (Amsler and O'Leary 2017), major themes of interest have emerged as common to models of collaborative governance. Examples include collaboration capacities, collaboration processes and collaboration structures (Ansell and Gash 2008; Bryson, Crosby, and Stone 2006; Emerson, Nabatchi, and Balogh 2012). In this paper, we explore a specific element of these models – collaboration processes – and their impact on the outcomes of the collaboration. Despite the importance of collaboration processes to build trust, legitimacy, common goals and understanding of policy choices, a focus on collaboration processes appears to be scarce in the literature in public management (Park, Krause, and Hawkins 2021; Varda, Shoup, and Miller 2012). To address this knowledge gap, this study asks the following question: What is the impact of factors of collaboration processes on the outcomes of the collaboration?

We address the research question by exploring the collaboration processes in 12 cases of food policy councils (FPCs) in the United States using concepts from network governance research to define and measure procedural characteristics of collaborative processes (e.g. Connelly, Zhang, and Faerman 2008; Saz-Carranza and Ospina 2011; Vangen 2017; Vangen and Winchester 2014). More specifically, we focus on four components of the collaboration process that are most used in this literature: the density of the relationships within collaborations, the diversity of participants in the processes, the inclusiveness of the collaborative process itself and the levels of participation during collaboration processes. Collaboration has been a core theme in the study of FPCs (Scherb et al. 2012), and previous research suggests that collaboration processes are a significant factor in determining the success of an FPC (Clayton et al. 2015). Due to their focus on outcomes and problem solving (Schiff 2008), FPCs constitute a useful context to understand collaboration. Furthermore, they also constitute a relatively understudied collaboration form (Ambrose, Siddiki, and Brady 2022).

To effectively provide a comparative analysis across several cases, we employ network analysis and fuzzy-set Qualitative Comparative Analysis (fsQCA). Using the configurational approach of fsQCA, we examine what combinations of conditions lead to different collaboration outcomes. As it is an ideal method for understanding change across a small number of cases, QCA allows us to consider both necessary and sufficient conditions as pathways to identify outcome variables. In our study, we find that there are no necessary conditions for effective collaboration arrangements. Our results suggest that effective collaborative processes, referring to actors' equal and substantial access to active deliberation, are a sufficient condition for producing the desired outcomes. In other words, although success may be linked to other aspects of collaborative governance, effective processes provide one path to success. In addition, our results suggest that the diversity of members of policy councils is contingent on the context; membership diversity is less important in areas that are less urban in nature.

Our research contributes to the literature in several ways. First, we advance research in collaborative governance by testing a conceptual framework that explains the impact of collaboration processes on collaboration outcomes, discussing specific interactions

among different aspects of the collaboration dynamics. Second, our results suggest elements of the design of collaboration processes that are relevant for FPCs in particular, and could be dispersed throughout the increasingly important policy area of food security. We also employ an innovative methodology that combines network analysis and fsQCA, and illustrate how it can be applied to research within the area of collaborative governance, and more widely to public policy and public management research. Finally, our study aims to integrate methods, models and previous literature. This study builds on one of the underlying arguments of network governance: that the extent and quality of collaboration is reflected in network structural characteristics (Carboni et al. 2017; Ulibarri and Scott 2017).

The rest of the paper is organized in five sections. The following section provides an overview of the contemporary scholarship, and includes the conceptual framework that guides our research effort. In this section, we include a detailed description of the main theories and the rationale for the selection of collaboration process characteristics included in the study. Section three of the paper includes a description of the methods and data that we use, as well as a description of food policy councils as collaborative governance mechanisms for policy implementation in the United States. Section four introduces the main results of the analysis. Section five provides a discussion of the results, citing primary insights within the extant literature and noting implications for theory and practice. We conclude with section six, which offers a discussion of the limitations of this study and offers potential avenues for future research.

A framework to understand the impact of collaboration processes on the outcomes of collaboration

The literature in collaborative governance identifies collaboration processes as one of the core aspects of collaboration (i.e. Ansell and Gash 2008; Bryson, Crosby, and Stone 2006; Emerson, Nabatchi, and Balogh 2012). The literature includes two major approaches to discuss the collaborative process. The first approach describes collaboration as a linear process that includes several stages (Agranoff and McGuire 2001), and the second approach considers the collaboration process as an iterative and nonlinear process involving 'repetitive sequences of negotiation, development of commitments, and execution of those commitments' (Thomson and Perry 2006, 21). Examples of this perspective, which we adopt in this paper, include the view from Ansell and Gash (2008) who represent the process as a virtuous (or vicious) cycle that includes face-to-face dialogue, trust building, commitment, shared understanding and intermediate outcomes. Trust, understanding and small wins reinforce the collaboration. Emerson and her colleagues (Emerson and Nabatchi 2015; Emerson, Nabatchi, and Balogh 2012) conceptualize collaboration as a dynamic process where actors build shared motivation, and capacity for joint action through principled engagement. Although it is common to study the impacts of collaboration processes on intermediate outcomes such as mutual trust, shared understanding or commitment, studying the impact of collaboration processes on policy or governance outcomes – the purpose of collaboration – is less common (Ansell and Gash 2008; Bryson, Crosby, and Stone 2015).

Recent empirical work has been successful in exploring internal dynamics in collaboration processes through the use of network theories and network configurations (Carboni et al. 2017; Scott, Thomas, and Magallanes 2019; Ulibarri and Scott

2017). For example, Carboni et al. (2017) use network characteristics to explore differences in descriptive and substantive representation of actors in a collaboration around local food systems. They find significant differences between the design and practice of inclusiveness in this collaboration process. Ulibarri and Scott (2017) apply network analysis to understand the differences between highly collaborative and less collaborative forms of governance. Scott, Thomas, and Magallanes (2019) combine network analysis and agent-based simulation to explore how collaboration processes may find consensus (or not).

We build on these two approaches to explore the impacts of collaboration processes and internal dynamics on policy outcomes. Drawing from the general collaborative governance models (e.g. Ansell and Gash 2008; Emerson, Nabatchi, and Balogh 2012), we seek a connection between collaboration processes with policy outcomes. Their central premises – face-to-face dialogue and the concept of principled engagement – involve those opportunities to exchange ideas and perspectives furthering solutions to public problems. Research on dialogue and principled engagement suggests that the inclusion and diversity of stakeholders involved allows for all relevant perspectives to be adequately represented when designing solutions to the stated problem (Ansell and Gash 2008; Bryson, Crosby, and Stone 2006; Emerson, Nabatchi, and Balogh 2012). On the other hand, we incorporate concepts from the network governance research to define and measure procedural characteristics of collaborative processes (e.g. Connelly, Zhang, and Faerman 2008; Saz-Carranza and Ospina 2011; Vangen and Winchester 2014).

Network governance theories suggest that collaborations are embedded in complex problems where the perception of success depends on stakeholder perspectives (Head 2008; Mandell and Keast 2008). Moreover, understanding network performance requires a combination of process and outcome measures (Head 2008; Mandell and Keast 2008; Skelcher and Sullivan 2008; Voets, Van Dooren, and De Rynck 2008). This research also suggests that combinations of procedural characteristics, rather than their individual effects, explain effective collaborative arrangements (Connelly, Zhang, and Faerman 2008; O'Leary and Vij 2012; Saz-Carranza and Ospina 2011; Vangen and Winchester 2014; Wang and Ran 2021). From our

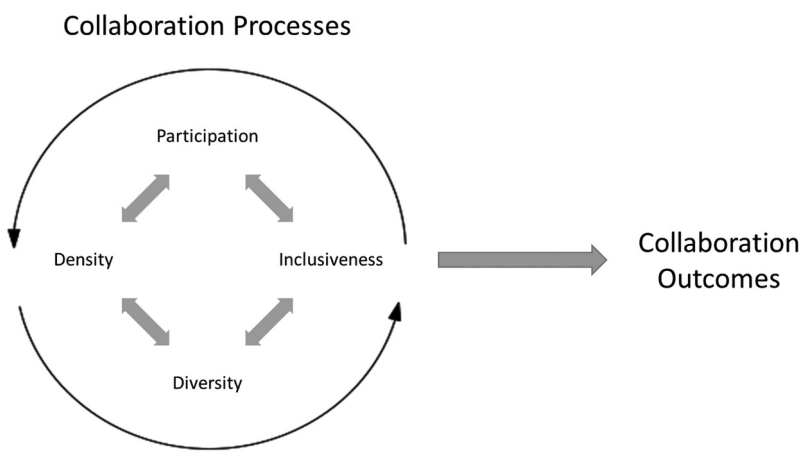

Figure 1. Research framework.

review of the literature, we identified four characteristics of collaboration processes that have an impact on the outcomes of the collaboration: network density, diversity, inclusiveness and participation (see Figure 1). Nonetheless, given that networks operate in complex environments, proving causal connections between a successful process and specific outcomes is a difficult task (Seo, Bryson, and Crosby 2023).

Network density and its impact on collaboration outcomes

Drawing from the network governance literature, we argue that dialogue, expressed as a process that allows stakeholders to build trust and shared understanding through rich face-to-face communication, may be represented by a network density – the ratio of observed connections to all possible connections for any given network (Wasserman and Faust 1994). The overall connectedness among organizations reflects principled engagement, including ambition to share resources, negotiate differences and reach common goals, given that network actors have multiple pathways to exchange information, perspectives and resources (Emerson, Nabatchi, and Balogh 2012; Phelps, Heidl, and Wadhwa 2012; Scott, Thomas, and Magallanes 2019; Ulibarri 2015; Ulibarri and Scott 2017). Network density can also improve the quality of collective decision-making because network actors can develop innovative solutions by examining a wide range of perspectives (Dawes, Cresswell, and Pardo 2009; Park, Krause, and Feiock 2019; Phelps, Heidl, and Wadhwa 2012; Scott, Thomas, and Magallanes 2019), also reducing coordination costs produced by conflict through the creation of spaces to resolve tensions and reach common ground for collaborative projects (Lee 2021; Park, Krause, and Feiock 2019; Provan and Kenis 2008; Provan and Milward 2001; Saz-Carranza and Ospina 2011; Scott, Thomas, and Magallanes 2019).

On the other hand, dense social relationships can indicate power imbalances among participants, when few actors dominate the relationships while overall connectivity is low (Ulibarri and Scott 2017). Unequal access to decision-making hampers stakeholder satisfaction and perceived legitimacy (Ansell et al. 2020; Hui, Ulibarri, and Cain 2020; Provan and Kenis 2008) and may also result in less equitable distribution of costs and benefits (Hui, Ulibarri, and Cain 2020; Park, Krause, and Feiock 2019; Ulibarri and Scott 2017). Furthermore, high levels of network density may suggest that network actors can be collectively blinded and, in turn, make less innovative decisions because information circulated within dense social relationships is not free from redundancy (Saz-Carranza and Ospina 2011).

Participant diversity and collaboration outcomes

A second component of principled engagement involves the diversity of participants. Diversity relates to different types of structural and institutional traits across organizations and other stakeholders in various dimensions such as geography, culture, characteristics and goals (Gazley, Chang, and Bingham 2010; Koski et al. 2018; Saz-Carranza and Ospina 2011). Diversity is often studied as an important ingredient for successful collaborative outcomes (Gazley, Chang, and Bingham 2010; Raab, Mannak, and Cambre 2015; Siddiki, Kim, and Leach 2017). Specifically, diversity can contribute by bringing credibility and legitimacy to the process (Gazley, Chang, and Bingham 2010), as well as unbiased and neutral

collective solutions (Siddiki and Goel 2017). Actor diversity facilitates the availability of useful perspectives in understanding problem issues, while simultaneously facilitating learning (Leach et al. 2014; Quick and Feldman 2011; Siddiki, Kim, and Leach 2017), fairness and justice for the members involved (Bingham, Nabatchi, and O'Leary 2005) and enhancing the potential for innovation (Klijn and Koppenjan 2016).

However, diversity can be costly and sometimes generate unintended consequences because of its paradoxical nature in collaboration (Emerson, Nabatchi, and Balogh 2012; Park, Krause, and Feiock 2019; Siddiki, Kim, and Leach 2017). Diversity can negatively influence collective outcomes because diverse perspectives and ideas may increase misunderstandings and conflicts (Vangen 2017; Vangen and Winchester 2014). Previous research suggests that this tension needs to be actively managed to harness its positive effect and to avoid the possibility of sub-optimal compromises (Prentice and Brudney 2016; Saz-Carranza and Ospina 2011; Siddiki, Kim, and Leach 2017; Smith 2020).

Process inclusiveness and collaboration outcomes

Having a diverse group of stakeholders does not guarantee that they will have full access to participation and collective decision-making (Carboni et al. 2017; Quick and Feldman 2011). Inclusiveness is the ongoing process of making connections among actors with diverse backgrounds and their interests, enhancing the group's capacity to implement decisions (Quick and Feldman 2011), as well as having all interests included in the outcomes (Hendriks 2008; Nissen 2014). Research suggests that having wider inclusion promotes richer deliberation (Ansell and Gash 2008; Ansell et al. 2020), increases fairness and legitimacy in the decision-making process (Ansell and Gash 2008; Ansell et al. 2020; Nissen 2014) and generates opportunities for improved learning (Hendriks 2008). Inclusion is also an important element of principled engagement in building trust among actors (Johnston et al. 2011), as an inclusive process enhances the capacity for joint action when more voices and more resources are combined (Emerson, Nabatchi, and Balogh 2012).

Similar to diversity, researchers have shown that wider inclusion in collaborative processes may lead to higher transaction costs, increasing the time and risk for delivering collaboration outcomes (Ansell et al. 2020; Johnston et al. 2011; Newig et al. 2018). Stakeholders at the core of the network may regard the wide inclusion of actors as an infusion of irrelevant information from the wrong people, producing inefficiencies (Park, Krause, and Feiock 2019; Ulibarri and Scott 2017). Issues of inclusion, representation and legitimacy are frequently tangled in this scholarly debate.

Actor participation and collaboration outcomes

The final component of the principled engagement that we consider is participation in the collaboration process. At its core, the participation of diverse stakeholders in problem solving is what constitutes collaborative governance (Ansell and Gash 2008; Carboni et al. 2017; Emerson, Nabatchi, and Balogh 2012; Newig et al. 2018). Actor opportunities for face-to-face interactions are crucial to effective representation and to the development of a robust exchange of ideas (Koski et al. 2018). Participation can increase effectiveness by drawing on a variety of resources, capabilities and

information (Fung 2015). In fact, research in collaborative governance suggests that it is not only about who has a seat at the table but who has a voice at the table, as well as the ways in which voices express themselves in the process (Ansell et al. 2020; Koontz and Johnson 2004; Koski et al. 2018; Newig et al. 2018).

Furthermore, greater participation can enhance legitimacy in the process by including all those who are affected (Ansell et al. 2020; Fung 2015; Leach 2006) and provide an avenue for the underrepresented stakeholder to voice their opinion, potentially providing a mechanism for better outcomes (Ansell and Gash 2008; Leach 2006; Newig et al. 2018). In fact, participants in restricted membership groups perceived themselves as less influential in decision-making, reducing their overall effectiveness (Dakins, Long, and Hart 2005).

Research design

Rationale of the method

We employ Qualitative Comparative Analysis (QCA), which is a set-theoretic approach that uses Boolean Algebra to detect regularities through systemic cross-case comparisons (Oana, Schneider, and Thomann 2021; Ragin 2008; Schneider and Wagemann 2012; Thomann 2020). Stated simply, the QCA approach conceptualizes conditions and outcomes as sets in which cases have membership (or not) and identifies what conditions and combinations of them serve as necessary or sufficient conditions for the outcomes by investigating relationships between sets (Greckhamer et al. 2018; Oana, Schneider, and Thomann 2021; Ragin 2008; Schneider and Wagemann 2012; Thomann 2020). QCA is suitable for systematically analysing a medium number of cases ranging from 10 to 50 (Ragin 2008; Schneider and Wagemann 2012). Our interest is in exploring combinations of collaboration characteristics as they relate to outcomes; QCA offers a robust approach to measuring the relationship between structural configurations and collaborative outcomes (Chen, Lu, and Dong 2022).

More specifically, we used fuzzy-set QCA (fsQCA), which allows for different degrees of set membership. Cases can be assigned as partial members of a set by using values that lie between 0 (non-membership) and 1 (full membership). The crossover point of 0.5 is used as a point of indifference that determines whether cases are in or out of a set (Oana, Schneider, and Thomann 2021; Ragin 2008; Thomann 2020). Using fsQCA, as opposed to crisp set QCA, provides a deeper understanding of causal conditions for the outcomes, given that fsQCA investigates 'differences in cases both in kind and in degree' instead of dichotomous set memberships (Cristofoli et al. 2021; Schneider and Wagemann 2012; Warsen, Klijn, and Koppenjan 2019, 380). Fuzzy-set QCA has been successfully used to expand our understanding of governance networks (e.g. Cepiku et al. 2021; Cristofoli et al. 2021; Mosley and Wong 2021; Raab, Mannak, and Cambre 2015; Yi, Liu, and Li 2020).

Empirical setting and case selection

Policy councils appear throughout the public policy and administration literature, loosely defined as participatory and deliberative governance mechanisms designed to address a broad range of important issues (Bassarab et al. 2019;

Clayton et al. 2015; Prové, de Krom, and Dessein 2019; Schiff 2008). We focus on the case of food policy councils (FPCs) in the United States as an example of this collaborative governance mechanism. FPCs goals include the improvement of food security and the promotion of a healthier local production system. FPCs are frequently designed to be inclusive, often with an overt intention to select representatives from every sector of the food system. FPCs may be formed as government or non-government organizations. While prior research suggests that FPCs function most successfully when constructed as government-led councils (Pothukuchi & Kaufman 1999; Dahlberg 1994), non-profit councils are common, and continue to form as novel governance mechanisms (Matacena 2016). The Johns Hopkins Center for a Livable Future (JHCLF) has compiled data on national food policy councils since 2012. According to their census, the population peaked at 325 FPCs in 2017, and currently stands at about 288 (Santo et al. 2020).

Understanding collaboration processes has been a core question in the study of FPCs, although scarce data have limited research efforts (Scherb et al. 2012). Close collaboration with government entities, without necessarily being an arm of government, has allowed some FPCs to retain their independence while leveraging government support (Gupta et al. 2018). In fact, member characteristics, such as their influence on policy, are a significant factor in the success of an FPC (Clayton et al. 2015). Research has also found that collaboration processes have a greater impact on developing representative and inclusive networks than FPCs formal structure (Porter, Ashcraft, and Iles 2020; Prové, de Krom, and Dessein 2019). Each of these characteristics suggests that the study of FPCs is likely to contribute to a more complete understanding of policy councils and provides insight into other participatory forms of community governance.

Given that food policy councils are diverse in structure and governance (e.g. public, non-profit, and informal grassroots) (Koski et al. 2018; Siddiki et al. 2015), we used a purposive sampling strategy. The cornerstone of QCA is to purposefully sample cases that are relevant to research questions and theories while ensuring that selected cases share enough background characteristics to facilitate comparison (Greckhamer et al. 2018). Consistent with previous research, we used the Johns Hopkins Center for a Livable Future (JHCLF) online database as a sampling frame (Ambrose, Siddiki, and Brady 2022; Bassarab et al. 2019). Our exploration of FPCs indicates significant variation in structure and goals across policy councils led by non-profit and grassroots organizations, while government-lead FPCs were much more similar in terms of structure and goals. In this way, we decided to focus on government-lead FPCs. In addition, we decided to focus on public FPCs at the county level, given that they may play similar roles in the policy process and within similar scope and complexity of policy problems (Siddiki et al. 2015).

Publicly mandated FPCs release their purposes, activities and meeting minutes, which allows for the use of publicly available documents to investigate collaboration processes (Carboni et al. 2017; Koski et al. 2018; Siddiki et al. 2015). We then conducted an extensive online search to refine the list, identifying those that provide meeting minutes for at least 2 years (2016–2017). Based on this selection criteria and process, we identified 12 FPCs located in 10 states. Appendix A includes the full list of FPCs in our sample as well as their mission statements and roles in the policy

processes. All these policy councils play advisory roles in the creation of policies to increase food access and improve the local food system.

Data, measurement and calibration

Using meeting minutes for each FPC, we produced a network dataset based on meeting attendance. We created a two-mode network dataset where the list of meetings occupies the columns (j) and the list of organizations occupies the rows (i). We coded cells with 1 when members from a certain organization i participated in a meeting j and 0 otherwise. We then transformed the two-mode network into a one-mode network dataset. Based on an assessment of the method, the specific context and the extant literature, this empirical approach is dependable and reliable. First, earlier studies have demonstrated that a social network analysis allows us to characterize complex interactions between actors (Carboni et al. 2017; Ulibarri and Scott 2017). Second, our network data collection strategy that examines meeting minutes is a well-established approach. The literature on policy forums has argued that joint participation in meetings provides actors with opportunities to create meaningful relationships through which information, perspectives and ideas can flow. Accordingly, relational structures drawn from joint participation can capture the characteristics and qualities of collaborative process (Berardo, Fischer, and Hamilton 2020; Ulibarri and Scott 2017). Finally, earlier studies on local food systems in the U.S. have investigated meeting attendance records from local food policy councils to investigate the deliberation process, policy development and policy outputs (Bassarab et al. 2019; Carboni et al. 2017; Koski et al. 2018; Siddiki et al. 2015). They have reported that organizations create meaningful relationships through principled engagement with other FPC members and non-member organizations attending the meeting. FPCs serve as platforms in which policy actors come together to dialogue about policy problems, shared challenges and develop consensus about community-level solutions (Bassarab et al. 2019; Carboni et al. 2017; Siddiki et al. 2015)

The following subsections include a description of how we operationalized all conditions and outcomes in our hypotheses, discussing variable calibration – the process of determining the degree to which cases have (non-)membership to sets representing each condition or outcome (Oana, Schneider, and Thomann 2021; Ragin 2008; Schneider and Wagemann 2012). Raw data of 12 FPCs is included in Appendix B.

Operationalization and calibration of collaboration outcomes

Food insecurity within the county was chosen as the primary outcome variable. The main rationale for this choice is that county-level food insecurity is one of the top priorities for FPCs (Bassarab et al. 2019; Boden and Hoover 2018; Koski et al. 2018; Siddiki et al. 2015). We used two data elements to measure this outcome: (1) The percentage of people in food insecure households from the Map the Meal Gap (MMG) dataset, and (2) the number of (Supplemental Nutrition Assistance Program) SNAP-authorized stores per 1,000 county inhabitants, including supermarkets, groceries and convenience stores. We used the 2019 MMG dataset that measures food insecurity in 2017, and we extracted the 2017 number of SNAP-authorized stores from the Food Environment Atlas 2020. Both outcomes have been successfully used to understand

food security in previous research (see Ali et al. 2022; Gundersen et al. 2021; Kim, Gundersen, and Windsor 2022 for MMG and Boden and Hoover 2018 for SNAP-Authorized stores).

To ensure the validity and robustness of the calibration process, theoretical or substantial knowledge should be used to identify thresholds (Oana, Schneider, and Thomann 2021; Ragin 2008; Schneider and Wagemann 2012; Thomann 2020). Since there are no theories that specified the criteria for defining a successful collaborative governance outcome (Wang 2016; Yi, Liu, and Li 2020), we relied on external knowledge to set up the qualitative anchors (Greckhamer et al. 2018). According to the United States Department of Agriculture (USDA), the national average food insecurity rate in 2017 and the number of SNAP-authorized stores per 1,000 people in 2019 are 11.8 per cent and 0.75, respectively. We used these numbers as the threshold for full membership of each collaboration outcome, assuming that FPCs are effective when they perform better than the national average. In this way, regarding food insecurity, we assigned the full membership score for effective FPCs to cases when their food insecurity rates are lower than the national average. When it comes to SNAP-authorized stores, we assume that local FPCs are effective when their number of SNAP-authorized stores is higher than the national average. This calibration resulted in a well-balanced set of cases with opposing outcomes. Regarding SNAP-authorized stores, among 12 FPCs, we have three cases belonging to the full membership and four cases that have full non-membership. With respect to food insecurity, four and two cases are allocated to full membership and full non membership, respectively. We conducted additional analyses using the median instead of the mean without finding any changes in membership or non-membership for all cases (see Appendix D). Further details regarding the calibration method for all variables are included in Table 1.

Operationalization and calibration of main conditions (collaboration processes)

Network density measures how many connections exist compared to possible relationships between actors on a scale of 0 (no ties exist among actors) to 1 (every possible ties exist) (Wasserman and Faust 1994). The 12 FPCs' network densities have values ranging from 0.556 to 0.838 (see Appendix B). Again, as we do not have theoretical grounds for defining a qualitative anchor for network density (Cui and Yi 2020; Wang 2016). Based on Cui and Yi (2020), we set up a cross-over point 0.7 to distinguish dense and non-dense networks. The full membership and full non-membership are set up at 0.75 and 0.6, respectively (see Table 1).

Regarding diversity and inclusiveness, we created composite measures using council membership and organizational type. That is, we assumed that FPCs can ensure the diversity and inclusiveness of perspectives if non-official members and organizations with diverse backgrounds participate (Hui, Ulibarri, and Cain 2020; Koski et al. 2018; Siddiki et al. 2015). Specifically, we combined the proportion of non-official members and the number of organizational types to operationalize diversity. We classified organizations into seven types, including government agencies, legislatures, NGO, business, business association, education and hospital. When it comes to inclusiveness, we calculated the proportions of realized connections among organizations having different characteristics for both council membership and organizational type.

Table 1. Overview of the calibration method.

Name (codes)	Calibration approach and thresholds	Criteria
Food Security (FS)	Continuous (direct[1]) - Equal to or below 11.8: Fully in (1) - Equal to 13: Crossover point (0.5) - Equal to or above 15: Fully out (0)	Based on Coleman-Jensen et al. (2018)
The number of SNAP-authorized stores per 1000 people (SNAP Store)	Continuous (direct) - Equal to or above 0.75: Fully in (1) - Equal to 0.6: Crossover point (0.5) - Equal to or below 0.5: Fully out (0)	Based on USDA (2019)
Density (DE)	Continuous (direct) - Equal to or above 0.75: Fully in (1) - Equal to 0.7: Crossover point (0.5) - Equal to or below 0.6: Fully out (0)	Based on Cui and Yi (2020)
Diversity (DI)	Four-value (qualitative) - Step 1: assign set memberships for council membership and organizational type ● Council membership: we coded councils where 50%, 50–40%, 40–30% and lower than 30% of participants are non-official members as full membership (fuzzy score = 1.00), partial full membership (fuzzy score = 0.67), partial non-membership (fuzzy score = 0.33) and full non-membership (fuzzy score = 0.00), respectively ● Organizational Type: Cases that have 7, 6, 5, lower than 4 organizational types are assigned to full membership, partial full membership, partial non-membership and full non-membership, respectively - Step 2: code a set membership for diversity using membership scores in council membership and organizational type ● Cases with (non)membership in both measures have a full set (non)membership score in diversity. If cases were (non)member of only one set, we assigned them to partial (non)membership (Nederhand 2021)	Based on Nederhand (2021)
Inclusiveness (IC)	Four-value (qualitative) - Step 1: assign set memberships for council membership and organizational type ● Council membership: councils where 70%, 70–65%, 65–60% and lower than 60% of realized ties between members and non-members received full membership, partial full membership, partial non-membership and full non-membership, respectively. ● Organizational Type: councils where 75%, 75–65%, 65–60% and lower than 60% of realized ties between members with different organizational types received full membership, partial full membership, partial non-membership and full non-membership, respectively. - Step 2: code a set membership for inclusiveness using membership scores in council membership and organizational type. ● Cases with (non)membership in both measures have a full set (non)membership score in diversity. If cases were (non)member of only one set, we assigned them to partial (non)membership (Nederhand 2021).	
Participation (P)	Continuous (direct) - Equal to or above 0.42: Fully in (1) - Equal to 0.37: Crossover point (0.5) - Equal to or below 0.34: Fully out (0)	Based on Koski et al. (2018)
Urbaneness (UR)	Four-value (qualitative) - Full membership: large central metro - Partial full membership: large fringe metro - Partial non-membership: medium metro - Full non-membership: small metro	Based on NCHS (2013)

[1] The direct calibration method fits the raw data with the qualitative anchors by using a logistic function (Oana, Schneider, and Thomann 2021; Schneider and Wagemann 2012).

Levels of participation are operationalized as the average rate of attendance. That is, we calculated the average number of meetings that policy actors participated in and divided it by the number of total meetings that food policy councils hosted. To set a qualitative anchor that distinguishes (non-)membership, we relied on Koski et al. (2018) who investigated FPCs in the western region of the U.S., finding that the most substantive representation shows 36 per cent of attendance rate.

Operationalization and calibration of the level of urbanness as contextual (control) condition

We use the level of urbanness as a control variable to include the influence of the context where the policy council operates. While 'rurality' is frequently considered a variable of interest, there has been little scholarship devoted to understanding the impact of rural-ness on FPC effectiveness. Recent scholarship has explored the ways in which engagement, collaboration and approaches to public health differ depending on geographic designation (e.g. Dailey et al. 2022; Thompson et al. 2020). To address rurality as a variable of interest, we relied on the 2013 NCHS (National Center for Health Statistics) Urban-Rural Classification Scheme for Countries to measure levels of urbanness (Kim, Gundersen, and Windsor 2022). The 2013 NCHS scheme classified countries into 6 groups based on population (large central metro, large fringe metro, medium metro, small metro, micropolitan and noncore). Our cases ranged from large central metro to small metro. We assigned the large central metro to full membership, a large fringe metro to partial membership, a medium metro to partial non-membership and a small metro to full non-membership. Other socioeconomic variables may be used to understand the context in which FPC operates such as income or education. Appendix A includes median household income and percentage of bachelor's degrees in the counties of the FPCs in the sample. We found no significant differences between successful and unsuccessful cases.

Results

Using set theory, QCA identifies the necessary and sufficient configurations of conditions that account for the presence and absence of an outcome. The analysis of the necessary conditions examines whether a configuration is a consistent superset of the outcome variable. We can say that 'a condition X is necessary for an outcome Y if, whenever we see the outcome Y present, condition X is also present' (Oana, Schneider, and Thomann 2021, 65). The analysis of the sufficiency of conditions identifies single or combinations of factors that are a subset of the outcome Y. That is, a condition X implies the outcome Y if whenever X happens, the outcome Y also occurs (Oana, Schneider, and Thomann 2021; Schneider and Wagemann 2012; Thomann 2020). The QCA analysis reports two parameters to identify the strength and importance of the relationship, consistency and coverage, which serve similar roles to significance and effect size in regression analyses, respectively (Greckhamer et al. 2018; Oana, Schneider, and Thomann 2021; Schneider and Wagemann 2012). In this way, consistency refers to the extent to which a set relationship deviates from a perfect necessary and sufficient pattern (Oana, Schneider, and Thomann 2021; Schneider and Wagemann 2012; Thomann 2020). Coverage, on the other hand, captures the degree to which the identified conditions are empirically relevant

and important, indicating 'how much the outcome is explained by the condition in question' (Schneider and Wagemann 2012, 139).

We begin with an analysis of necessary conditions followed by an analysis of sufficient conditions, which is common QCA practice (Schneider and Wagemann 2012). We used a common rule-of-thumb threshold for both consistency (>0.9) and coverage (>0.5) (Greckhamer et al. 2018; Oana, Schneider, and Thomann 2021; Schneider and Wagemann 2012). In terms of necessary conditions, no condition satisfies the threshold values for both food security and the SNAP-authorized stores, indicating that there are no single or combinations for the (non-)occurrence of the outcomes (see Table 2).

The sufficiency analysis is based on a truth table that provides all logically possible combinations of causal conditions for the outcome (Oana, Schneider, and Thomann 2021; Schneider and Wagemann 2012; Thomann 2020). The rows in the truth table display possible configurations and cases corresponding to each configuration. Following current practices of QCA, we used a raw consistency cut-off value of 0.8 (Fadda and Rotondo 2020; Greckhamer et al. 2018; Schneider and Wagemann 2012). To identify the shortest possible expressions (or solution terms), we performed a minimization process. We used the most conservative solution for the logical minimization because all truth tables do not have logical remainders, meaning empirically unobserved configurations (Oana, Schneider, and Thomann 2021; Schneider and Wagemann 2012; Thomann 2020).

Table 3 shows solution terms for the occurrence of the outcomes. Configurations resulting from the sufficiency analyses can be regarded as meaningful antecedents for the outcome when their consistency is above 0.75–0.8 and coverage is above 0.25 (Cristofoli et al. 2021; Cristofoli, Trivellato, and Verzillo 2019; Yi, Liu, and Li 2020). Table 3 shows overall solution coverages for food security and SNAP-authorized stores of 0.462 and 0.367, indicating that the solutions account for 46.2 and 36.7 per cent of the membership in outcomes. The overall solution consistency values are 0.856 and 0.863, meaning that 85.6 and 86.3 per cent out of our cases with these configurations have effective food policy councils. Raw consistency and coverage scores also suggest that all individual configurations are informative because they achieve acceptable levels of model fit.

As described in Table 3, there are two possible paths for food policy councils that achieve food security. The first path has high membership scores in density, participation, diversity and inclusiveness. This means that food FPCs are effective when they have

Table 2. Analyses of necessary conditions.

	The Presence of Food Security		The Absence of Food Security		The Presence of SNAP-authorized Stores		The Absence of SNAP-authorized Stores	
	Consistency	Coverage	Consistency	Coverage	Consistency	Coverage	Consistency	Coverage
DE	0.543	0.735	0.375	0.34	0.726	0.782	0.269	0.318
P	0.685	0.701	0.544	0.373	0.79	0.644	0.516	0.46
DI	0.593	0.638	0.802	0.578	0.722	0.619	0.59	0.554
IC	0.688	0.643	0.734	0.46	0.782	0.583	0.646	0.527
UR	0.624	0.612	0.745	0.489	0.657	0.513	0.698	0.597
~DE	0.513	0.55	0.708	0.51	0.368	0.315	0.816	0.765
~P	0.387	0.559	0.563	0.545	0.338	0.389	0.601	0.758
~DI	0.608	0.821	0.497	0.45	0.479	0.516	0.595	0.701
~IC	0.423	0.704	0.431	0.48	0.366	0.485	0.49	0.711
~UR	0.479	0.737	0.409	0.422	0.484	0.594	0.431	0.579

Table 3. Sufficient conditions for effective food policy councils.

	Food Security		SNAP-authorized Stores
	Path 1	Path 2	Path 1
Configuration	DE*DI*IC*P	DE*IC*P*~UR	DE*IC*P*~UR
Raw coverage	0.369	0.303	0.367
Unique coverage	0.160	0.093	-
Consistency	0.836	0.894	0.863
Cases	9, 6, 7	10, 9	10, 9
Solution coverage	0.462		0.367
Solution consistency	0.865		0.863

dense and inclusive network structures in which diverse stakeholders participate. The presence of all these conditions is sufficient to have a successful level of food security, regardless of the urbanness in the county where the FPC operates. The second path consists of a combination of dense and inclusive networks, active participation and less urbanness. This configuration suggests that diversity is not as relevant for those counties that are more rural in nature, and FPCs in these counties have effective collaboration processes when policy actors have dense, participative and inclusive relationships. When considering access to SNAP-authorized stores as the dependent variable, the only path also includes the combination of dense and inclusive networks, active participation and less urbanness, equal to the second configuration for food security.

QCA is rooted in casual asymmetry. That is, sufficient conditions for the occurrence of high-performing food policy councils can differ from those leading to its non-occurrence (Greckhamer et al. 2018; Oana, Schneider, and Thomann 2021; Thomann 2020). Therefore, we also ran a sufficiency analysis to investigate causal conditions for poor-performing food policy councils. We found no paths with sufficient conditions for food insecurity, but we identified four potential paths leading to the absence of SNAP-authorized stores (see details in Appendix C). Although solution coverage and consistency values are higher than the recommended levels of model fit (see Table 4), only the first two paths have an acceptable raw coverage (>0.25). The first path for having limited access to SNAP-authorized stores consists of low network density, low participation and high levels of diversity, inclusiveness and urbanness. This suggests that food policy councils in counties that tend to be more urban could be ineffective even when diverse actors have inclusive relationships if the relationships are sparse and the overall participation rate is low. The second configuration is a combination of low density and diversity and high participation, inclusiveness and urbanness. This indicates that although food policy councils in more urban counties have active participation and inclusive relationships, they can be ineffective if policy actors who have

Table 4. Sufficient conditions for ineffective food policy councils.

	SNAP-authorized Stores			
	Path 1	Path 2	Path 3	Path 4
Configuration	~DE*DI*IC*~P*UR	~DE*~DI*IC*P*UR	~DE*DI*IC*P*~UR	~DE*~DI*~IC*~P*~UR
Raw coverage	0.263	0.260	0.219	0.203
Unique coverage	0.132	0.109	0.050	0.107
Consistency	0.834	0.869	1	0.946
Cases	4	3, 11	5	8
Solution coverage	0.612			
Solution consistency	0.859			

similar social backgrounds have sparse relationships. In other words, less effective collaboration processes are a sufficient cause for FPC failure, particularly in areas that are more urban in nature.

Discussion

Our analysis supports findings from previous research, suggesting that there is no single factor that can fully explain effective and ineffective collaborative governance (Ansell and Gash 2008; Emerson, Nabatchi, and Balogh 2012; O'Leary and Vij 2012; Smith 2020; Wang and Ran 2021). Our findings suggest that none of the conditions are necessary for effective and ineffective food policy councils, but network density coupled with participation, diversity and inclusiveness may be sufficient for effective food policy councils. In other words, although there are other potential ways of producing positive collaboration outcomes, perhaps due to institutional arrangements, leadership or other elements of collaborative governance, effective collaborative processes are one path to effectiveness as it is suggested in our general framework.

We also investigated commonalities and differences between sufficient causal paths to success, and all sufficiency configurations for effective food policy councils include network density as one of the key conditions. Interestingly, we also found a lack of network density as a commonality in all configurations for ineffective food policy councils. This supports our expectation that the quality of collaborative arrangements depends on the network structures in which they are embedded. As noted above, dense social relationships between actors improve deliberative decision-making, shared motivation, legitimacy and social trust (Lee 2021; Scott, Thomas, and Magallanes 2019; Ulibarri and Scott 2017).

Stakeholder engagement, in the form of inclusiveness and participation, is a second key dimension for effective collaborative processes. Collaborative settings that include non-members of food policy councils in meetings and in conversations give non-members the opportunity to participate in the decision-making processes, yielding benefits such as increased justice, fairness and legitimacy in the collaboration process (Ansell and Gash 2008; Ansell et al. 2020; Nissen 2014). These process mechanisms are tangible: FPCs that promote this inclusive environment may also accumulate more member support of (and commitment to) policies and agreements (Johnston et al. 2011). Furthermore, consistent with the literature, the intention to support inclusivity and stakeholder engagement is only effective if the stakeholders participate regularly in the conversation (e.g. Ansell et al. 2020; Koski et al. 2018); in other words, they must also partake in the processes offered, including attending meetings. This combination of inclusiveness and participation leads to effective collaborative processes by increasing the resources available and perspectives circulated within collaborative arrangements, thereby improving fairness and legitimacy in the collective decision-making process (Ansell and Gash 2008; Ansell et al. 2020; Quick and Feldman 2011).

Our findings also illustrate that there is a complementary relationship between network density and stakeholder engagement that may mitigate potential negative effects identified in previous research. First, network density can indicate power imbalances between participants because it can mask situations when social connections are concentrated to only a few actors (Hui, Ulibarri, and Cain 2020; Ulibarri and Scott 2017). When a small number of powerful actors dominate the decision-making process, 'collaborative arrangements have struggled with representative and inclusive engagement' (Hui, Ulibarri, and Cain 2020, 756), which negatively influences stakeholder satisfaction and perceived

decision-making legitimacy (Hui, Ulibarri, and Cain 2020; Provan and Kenis 2008; Saz-Carranza and Ospina 2011). We find that substantial stakeholder engagement tempers this proclivity; to reduce dominance by a few powerful actors, effective FPCs allow for wider inclusion of policy actors and their participation in the decision-making process (Hui, Ulibarri, and Cain 2020; Ulibarri and Scott 2017). Conversely, network density can also prevent the negative impact of substantial stakeholder engagement. Specifically, active and inclusive participation has been found to increase costs to address disagreements because actors with heterogeneous preferences and perspectives will work as a veto point (Newig et al. 2018; Park, Krause, and Feiock 2019; Ulibarri and Scott 2017). Network density can mitigate the negative impact of substantial stakeholder input by facilitating mutual trust and shared norms, which can hold heterogeneous actors together and smooth out the negotiation processes (Lee 2021; Scott, Thomas, and Magallanes 2019; Ulibarri and Scott 2017). In sum, our findings indicate that effective collaborative processes guarantee actors' equal access to active deliberation and decision-making, providing a path to successful collaborations.

Finally, we found that diversity turns out not to be a relevant factor for food policy councils located in less urban areas, a finding that is not altogether surprising, considering that rural regions tend to be less diverse than their more urban counterparts. Still, the blurring of diversity lines is an active research question (Lee and Sharp 2017), one that questions both the diversity of less-urban FPCs, and the mechanisms by which they attract and engage participants. In this way, one potential explanation for diversity's lack of relevance in less urban FPCs could be that areas with lower levels of urbanness tend to be less diverse than those in more urban contexts, so coordinated efforts can come from groups that are less diverse when compared with their counterparts in more urban areas. A second potential explanation could reside in a reduced complexity of the problems in less urban areas when compared with those places with higher population density.

Our research contributes to the literature in several ways. First, this study advances research in collaborative governance by empirically testing the impact of collaborative processes on outcomes. As indicated at the outset (see Figure 1), this research is guided by theories of network and collaborative governance, and, in particular, scholarship focused on stakeholder engagement and inter-organizational dynamics. Although collaborative processes are considered key collaborative characteristics, only a few studies empirically tested their impacts on collaborative performance. Within the collaborative governance literature, previous empirical studies mostly describe the patterns of stakeholder representation within collaborative systems (e.g. Hui, Ulibarri, and Cain 2020; Koski et al. 2018; Scott, Ulibarri, and Scott 2020; Siddiki et al. 2015; Yoon et al. 2022). In terms of inter-organizational dynamics, much prior research approached single collaborative networks through interviews and surveys without mapping the detailed characteristics of the network (Berardo, Fischer, and Hamilton 2020; Isett et al. 2010; Whetsell et al. 2020). As a result, we have limited knowledge into how actual social structures and their differences across collaborative arrangements influence collaborative outcomes. We address these limitations by collecting data on social networks and operationalizing fuzzy concepts such as stakeholder engagement on 12 different local FPCs.

Furthermore, our research confirms that the impact of collaborative characteristics is context specific (Siciliano, Carr, and Hugg 2020). That is, we argued that the combinations of collaborative characteristics should be considered to address the paradoxical nature of collaboration – the ways in which different combinations may produce positive

or negative effects – and, in turn, reinforce or reduce effective collaboration (Connelly, Zhang, and Faerman 2008; O'Leary and Vij 2012; Saz-Carranza and Ospina 2011; Smith 2020; Vangen and Winchester 2014; Wang and Ran 2021). Network density and substantive stakeholder input have a complementary relationship that serves to mitigate the negative impact of the other. Our research contributes to the literature on collaborative governance by moving past the simple contention that the contingent approach to collaborative governance matters (Smith 2020); instead, we offer a theory-based explanation regarding which combinations of collaborative procedural characteristics lead to high collaborative performance and why the combined effect of these conditions work.

In addition, our research contributes to a broader discussion about the impact of FPCs on improving food security and access. Our research suggests that FPCs are one effective collaborative governance strategy. In order to be effective, processes must be inclusive and provide multiple ways of engaging and participating in the development of food security policies and projects. A focus on including a diverse enough group of stakeholders seems to be more important in jurisdictions that are more urban in nature. Finally, our paper adds to research on collaborative governance by extending previous research that uses network characteristics to understand effective forms of collaboration. In particular, we develop a set of network measures that can be used to describe how effective collaboration processes are within a policy network. This is of particular importance considering the heterogeneous context of food security and access, where participation, inclusivity and diversity vary, the particular ways in which those characteristics express may significantly impact whether food policy councils are effective in their missions or not.

Conclusion

In this paper, we explored the effect of collaborative processes on the outcomes of collaboration, by examining meeting minutes for 12 food policy councils. In order to define effective collaboration processes, we relied on social network analysis to inform both our theoretical discussion and empirical analysis. That is, drawing on the network governance literature (Kapucu and Hu 2020; Provan and Kenis 2008), we demonstrated the impact of several network characteristics on collaboration outcomes. We focused on four conditions: network density, diversity, inclusion and participation of actors in collaborative arrangements.

Our study adds the following new perspectives to the literature on collaborative governance and network governance. First, we offer a unique contribution to the literature by investigating the impact of collaborative procedural characteristics jointly while highlighting the paradoxical nature of particular aspects of collaboration. Due to the difficulties in collecting network data, previous studies heavily relied on surveys and interviews. Here, we expanded on that approach to collaboration by constructing multiple network datasets drawn from meeting minutes. Finally, we systemically compared multiple networks through the application of QCA to the study of networks. Our empirical analysis of multiple networks expands our understanding of how actual compositions of networks and differences across them influence collaborative performance.

Our findings also involve important practical implications. First, and given the relevance of network density in our findings, managers of FPCs may benefit from a focus on increasing the number of trusted relationships within their FPC through mechanisms that encourage regular engagement. In addition, encouraging the

participation of community stakeholders that are not formally members of the FPC appears to improve the impact of policies and projects, as captured by our measures of diversity and inclusiveness. Once again, managers of FPCs should not only be open to the participation of these stakeholders but may benefit from actively reaching out and inviting them to participate in the conversation within the policy council. Finally, given the potential importance of engaging conversations to reduce potential negative effects of power imbalances within the network, council managers may increase their council's effectiveness by considering the development of decision-making rules that promote an engaging and democratic environment within the policy council.

It is important to note that both the conceptual and practical implications of this research may be applied to policy councils in other domains. Collaborations in any domain will benefit from a focus on the needs and interests of multiple stakeholders, on the development of clear decision-making rules and on the importance of building trusted relationships. In fact, as part of our current research agenda, we have begun preliminary work to extend our research inquiry to policy councils involved in regional economic development and sustainability efforts in the northeastern United States. This research plan will involve more detailed case study analysis, including interviews, to better understand the more granular collaboration results that we could not observe in this research.

Finally, this article has several limitations that can serve to guide future research. First, this study did not consider the other main dimensions of collaborative governance such as leadership and collaboration structures (Ansell and Gash 2008; Bryson, Crosby, and Stone 2015; Klijn and Koppenjan 2016). In other words, our focus on local FPCs operated by governments limited the variety of collaborative structures within the 12 cases included. Future research should investigate FPCs formed by both government and non-government organizations, which would allow for investigating the impact of collaborative structures and the intersection of structures and processes (Bryson, Crosby, and Stone 2015). Also, future research can investigate the role of specific actors by focusing on their leadership in coordinating the behaviours and preferences of stakeholders, as well as the roles they play in developing policies and relationships within the network (Ansell and Gash 2008; Klijn and Koppenjan 2016).

Second, although purposive sampling constitutes an appropriate strategy to increase comparability and inform theory, it also potentially limits the generalizability of findings into other forms of collaborative governance or policy councils in different domains. In particular, the collaborative governance literature has pointed out that policy areas have their own contexts that influence collaborative processes (Lee 2021). However, our findings resonate with previous studies situated in different policy contexts (Hui, Ulibarri, and Cain 2020; Lee 2021; Saz-Carranza and Ospina 2011; Ulibarri and Scott 2017). Moreover, the expansion of this sample – and of this particular policy domain – represents a significant thread of additional future research.

Given that FPCs operate in complex environments, and previous research has found that connecting good collaboration processes and outcomes is difficult in these complex environments (Head 2008; Mandell and Keast 2008; Skelcher and Sullivan 2008; Voets, Van Dooren, and De Rynck 2008), it is possible that other external factors play important roles in determining success on these cases (Seo, Bryson, and Crosby 2023). We tried to capture this complexity by including the level of urban-ness as a contextual control variable, but we recognize that the measure is not perfect. Because of that, we also investigated socio-economic variables in the counties where the FPCs in our research operate, including data on median household income and the percentage of bachelor's degree holders from the

2021 American Community Survey. Although there are no significant differences between successful and unsuccessful cases, the heterogeneity in socio-economic factors implies that there may be other potential pathways towards effectiveness, and that those pathways may not necessarily rely on collaborative interactions and processes within FPCs. Future research must account for these external factors to better explain success.

Finally, there are opportunities to expand upon our use of this social network dataset and theories. Although social structures are the context for joint decision-making and action, they do not directly measure participants' motivations and behaviours (Siciliano, Carr, and Hugg 2020). Therefore, we emphasize the need for future studies that employ well-structured surveys and interviews to better understand the collaborative process configurations explored in this study. Moreover, other theories could be applied to better understand long-term performance and sustainability of these policy councils.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendices

Appendix A. Food Policy Councils Sample for this study

The cornerstone of QCA is the purposive sampling of cases that are relevant to research questions and theories while ensuring that selected cases share enough background characteristics to facilitate comparison (Greckhamer et al. 2018). To check whether our case selection complies with good QCA practices, we analysed 12 FPCs' mission statements and roles in the policy process by going over their policy documents and websites. As shown below, we found that all 12 cases mention food security and accessibility as one of the key policy goals. Furthermore, their roles in the policy process are similar, given that they focus on inviting relevant policy stakeholders to FPCs and providing policy recommendations and advice to local governments and officials.

We have also obtained data on median household income and the percentage of bachelor's degree holders from the 2021 American Community Survey. Although there are no significant differences between successful and unsuccessful cases, the heterogeneity in socio-economic factors implies that there might be other possible pathways towards effectiveness that may not necessarily rely on collaborative interactions and processes within FPCs.

No.	Name	States	Mission Statements	Roles in the Policy Process	Median Household Income	Bachelor's Degree
1	Philadelphia Food Policy Advisory Council	PA	The Philadelphia Food Policy Advisory Council envisions that all Philadelphians can access and afford healthy, sustainable, culturally appropriate, local and fair food.	Meetings, projects, testimony and policy recommendations.	$52,899	34.8%
2	Douglas County Food Policy Council	KS	Guide the creation of a local food system that promotes health, economic vitality, sustainability and equity.	Advise elected officials on food-system related policy issues and provide a community forum for local food system development	$56,578	52.5%
3	Austin Travis County Food Policy Board	TX	Improving the availability of safe, nutritious, locally and sustainably grown food at reasonable prices for all residents, particularly those in need, by coordinating the relevant activities of city government, as well as non-profit organizations, and food and farming businesses.	Advise both the Austin City Council about ways to improve the availability of safe, nutritious, locally grown, affordable and sustainable food for all residents, particularly those in need.	$77,311	52.5%

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No.	Name	States	Mission Statements	Roles in the Policy Process	Median Household Income	Bachelor's Degree
4	San Francisco Food Security Task Force California	CA	Creating a city-wide plan for addressing food security.	Provide general advice and assistance to the Board of Supervisors with regard to funding priorities, legislative action and city policies on addressing hunger and enhancing the food security of San Francisco residents.	$121,826	60.9%
5	Washtenaw County Food Policy Council	MI	Increase and preserve access to safe, local and healthy food for all residents of Washtenaw County.	An advisory subcommittee of the Washtenaw County Board of Commissioners that increases and preserves access to safe, local and healthy food for all residents of Washtenaw County	$76,918	57.3%
6	Buffalo and Erie Food policy councils	NY	Advocate for an equitable and sustainable food system for the people of Buffalo and Erie County.	Produce policy proposals and manage the implementation of local food action plan objectives.	$64,423	36.7%
7	Pasco County Food Policy Advisory Council	FL	The development of responsible policies improving access to culturally appropriate, nutritionally sound and affordable food produced in Pasco County.	Review proposed legislation and regulations that affect the food system and make recommendations to government bodies	$59,470	28.5%
8	Colorado Springs County Food Policy Advisory Board	CO	Production, processing and manufacturing, distribution, health education and market development, food recovery and food security.	Advise City Council and the El Paso County Commissioners on matters of policies, programmes, operations and land use rights affecting local food issues.	$74,579	42.8%

(*Continued*)

(Continued).

No.	Name	States	Mission Statements	Roles in the Policy Process	Median Household Income	Bachelor's Degree
9	Harvey County Food and Farm Council	KS	1) Improve access to locally grown, healthy foods 2) Develop strategies in ensure community residents are able to obtain safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance; 3) Provide a forum to bring together stakeholders from diverse food-related sectors for discussion	Solicit public input through public meetings or informational sessions, develop policy recommendations, review progress made on each of its recommendations.	$60,653	32%
10	Linn County Food Systems Council	IA	Bring together agriculture, food industry, educators, economic development, conservation and hunger representatives onto one council to enact transformative change in our food system.	Guide and advise the county on the necessary policies and programmes that will make Linn County's food system equitable, accessible, secure, diverse, resilient & regenerative.	$69,420	36.2%
11	Rappahannock-Rapidan Regional Food Policy	VA	1) Provide affordable and abundant healthy food for our informed families and community 2) Provide a competitive financial return, respect for our farmers and good jobs for our community 3) Protect and regenerates the health of our farmland and natural resources	Foster implementation of regional food projects, assessing and providing recommendations on local food policy, and other related duties as needed.	$90,307	31.8%

(*Continued*)

(Continued).

No.	Name	States	Mission Statements	Roles in the Policy Process	Median Household Income	Bachelor's Degree
12	Suffolk County Food Policy Council	NY	1) Promote the production, distribution and awareness of locally grown food. 2) Strengthen and prioritize policies that will improve food access, health and nutrition. 3) Enhance the regional food system by utilizing local agriculture, fishing and shellfish aquaculture.	Develop and advocate to timely public policy initiatives and best practices that will be recommendations to legislature	$113,683	40.6%

Appendix B. Raw data of 12 FPCs

No.	Case Name	Food Insecurty	SNAP Store	Density	Diversity		Inclusiveness		Participation	Urbaneness
					Mememembership	Organizational Type	Membership	OIrganizational Type		
1	Philadelphia Food Policy Advisory Council	20.1	1.112	0.626	0.438	7	0.638	0.631	0.365	6
2	Douglas County Food Policy Council	15.9	0.654	0.702	0.333	7	0.622	0.693	0.363	3
3	Austin Travis County Food Policy Board	14.6	0.505	0.662	0.048	6	0.577	0.713	0.393	6
4	San Francisco Food Security Task Force California	13.3	0.493	0.630	0.609	5	0.722	0.600	0.338	6
5	Washtenaw County Food Policy Council	13.2	0.582	0.638	0.481	5	0.670	0.640	0.377	4
6	Buffalo and Erie Food policy councils	12.7	0.855	0.774	0.450	5	0.818	0.816	0.519	6
7	Pasco County Food Policy Advisory Council	12.7	0.635	0.788	0.333	6	0.656	0.759	0.521	5
8	Colorado Springs County Food Policy Advisory Board	11.8	0.431	0.563	0.045	4	0.381	0.545	0.313	4
9	Harvey County Food and Farm Council	11.6	0.692	0.838	0.133	7	0.538	0.867	0.536	4
10	Linn County Food Systems Council	10.8	1.073	0.725	0.250	4	0.583	0.663	0.438	4
11	Rappahannock-Rapidan Regional Food Policy	8	0.137	0.690	0.476	4	0.736	0.681	0.410	5
12	Suffolk County Food Policy Council	5.5	0.451	0.557	0.677	6	0.681	0.582	0.355	5

Appendix C. Truth tables for sufficient conditions

Following current practices of QCA, we used a raw consistency cut-off value of 0.8 (Fadda and Rotondo 2020; Greckhamer et al. 2018; Schneider and Wagemann 2012). Thus, the outcome column in each table (OUT) presents a 1 when the consistency value is higher than 0.8 and 0 otherwise. To identify the shortest possible expressions (or solution terms), we performed a minimization process using the configurations that have the outcome value of 1 for all tables. We used the most conservative solution for the logical minimization because all truth tables do not have logical remainders, meaning empirically unobserved configurations (Oana, Schneider, and Thomann 2021; Schneider and Wagemann 2012; Thomann 2020).

We only identified solutions for the absence of SNAP-authorized stores because values in the outcome column in the truth table for the absence of food security have all zero values (see truth Table B2).

Table C1. Truth table for the presence of food security.

DE	P	DI	IC	UR	OUT	n	incl	PRI	cases
1	1	1	1	1	1	2	0.898	0.836	6,7
1	1	0	1	0	1	1	0.875	0.834	10
1	1	1	1	0	1	1	0.853	0.793	9
0	0	0	0	0	0	1	0.765	0.666	8
0	1	0	1	1	0	2	0.69	0.58	3,11
0	1	1	1	0	0	1	0.654	0.488	5
0	0	1	0	1	0	2	0.634	0.45	1,12
0	0	1	1	1	0	1	0.618	0.355	4

Note: 1 represents set membership; zero, non-membership. Raw consistency denotes the degree to which a set membership exists. PRI stands for proportional reduction in inconsistency, indicating whether a given condition X is a subset of Y rather than ~Y. A rule-of-thumb cut-off for PRI is 0.51 (Oana, Schneider, and Thomann 2021).

Table C2. Truth table for the absence of food security.

DE	P	DI	IC	UR	OUT	n	incl	PRI	cases
0	0	1	1	1	0	1	0.759	0.593	4
0	0	1	0	1	0	2	0.7	0.55	1,12
0	1	1	1	0	0	1	0.619	0.436	5
0	1	0	1	1	0	2	0.572	0.42	3,11
0	0	0	0	0	0	1	0.531	0.334	8
1	1	1	1	1	0	2	0.478	0.164	6,7
1	1	1	1	0	0	1	0.438	0.207	9
1	1	0	1	0	0	1	0.374	0.166	10

Table C3. Truth table for the presence of SNAP-authorized stores.

DE	P	DI	IC	UR	OUT	n	incl	PRI	case
1	1	0	1	0	1	1	0.841	0.725	10
1	1	1	1	0	1	1	0.811	0.618	9
1	1	1	1	1	0	2	0.792	0.712	6,7
0	0	0	0	0	0	1	0.507	0.1	8
0	0	1	0	1	0	2	0.492	0.371	1,12
0	1	1	1	0	0	1	0.471	0	5
0	0	1	1	1	0	1	0.383	0.213	4
0	1	0	1	1	0	2	0.359	0.169	3,11

Table C4. Truth table for the absence of SNAP-authorized stores.

DE	P	DI	IC	UR	OUT	n	incl	PRI	cases
0	1	1	1	0	1	1	1	1	5
0	0	0	0	0	1	1	0.946	0.9	8
0	1	0	1	1	1	2	0.869	0.831	3,11
0	0	1	1	1	1	1	0.834	0.787	4
0	0	1	0	1	0	2	0.7	0.629	1,12
1	1	1	1	0	0	1	0.693	0.382	9
1	1	0	1	0	0	1	0.581	0.275	10
1	1	1	1	1	0	2	0.485	0.288	6,7

Appendix D. Robustness Check

One might question our approach to defining effective FPCs because the national average is a poor measure of central tendency for skewed data. However, for both outcomes, the mean and median are very close. As for the food insecurity rate, the mean and median 12.8 and 11.8 per cent, respectively. The mean and median values of the SNAP authorized stores are 0.75 and 0.86 per cent, respectively. We also test whether our key findings are robust to alternative cut-offs, which use the median instead of the mean. Tables D1 and D2 report that our configurations for both effective and ineffective FPCs are exactly the same regardless of whether we use the median and the mean as the cut-offs.

Table D1. Sufficient conditions for effective food policy councils.

	Food Security		SNAP-authorized Stores
	Path 1	Path 2	Path 1
Configuration	DE*DI*IC*P	DE*IC*P*~UR	DE*IC*P*~UR
Raw coverage	0.336	0.276	0.390
Unique coverage	0.145	0.085	-
Consistency	0.836	0.894	0.863
Cases	9, 6, 7	10, 9	10, 9
Solution coverage	0.421		0.390
Solution consistency	0.852		0.863

Table D2. Sufficient conditions for ineffective food policy councils.

	SNAP-authorized Stores			
	Path 1	Path 2	Path 3	Path 4
Configuration	~DE*DI*IC*~P*UR	~DE*~DI*IC*P*UR	~DE*DI*IC*P*~UR	~DE*~DI*~IC*~P*~UR
Raw coverage	0.250	0.249	0.202	0.203
Unique coverage	0.126	0.105	0.047	0.110
Consistency	0.835	0.877	1	0.992
Cases	4	3, 11	5	8
Solution coverage	0.592			
Solution consistency	0.875			