*­­Note to Editor and Reviewers*“Citation Mapping: A Powerful Tool for Producing and Visualizing Data-driven Reviews of Research Fields” (PS-D-23-00150)
27-Feb-2024

We are grateful to the Editor for the opportunity to revise our manuscript and we thank the Editor and reviewers for the thorough and thoughtful set of reviews. In this Note, we detail the steps we have taken to address each comment. All new analyses discussed in this document are detailed in full in the manuscript and supplementary material. We include text from the revised manuscript where relevant, with page numbers that reference the submitted revised manuscript. We have made every effort to leave no stone unturned in our revision of the manuscript, which includes three main areas of revised text:

1. The inclusion of additional methodological detail in the main text of the manuscript, as well as in the Appendix.
2. Clarification of the “big picture” contribution of citation mapping as a method, with reference and comparison to related methods.
3. Setting out the research questions on “organizing” that the current study addresses through citation mapping, with reference to the *American Review of Political Science* (*ARPS*) article that is closely linked to this article.

We look forward to your comments on the revised manuscript. We are committed to responding swiftly and thoroughly to any additional requests for revisions with a focus on contributing an impactful and well-cited article to the *PS: Political Science and Politics* intellectual community. Below, we provide our detailed response to each of the Editor’s and reviewers’ comments in the order in which they appear in the referee report:

**Editor**

 **I am pleased to invite you to revise and resubmit your manuscript to PS: Political Science and Politics. All four reviewers and I agreed that your work would make a great contribution to the journal. We have a few suggestions on how to improve the manuscript that I think you'll be able to execute without difficulty, and I’ll ask the reviewers to take a second look after your revisions to ensure that their concerns are satisfied. Some of these revisions may require a somewhat longer manuscript; I am willing to extend your word limit by 1000 words to accommodate these changes.**

\*\*We appreciate the opportunity to revise the manuscript, as well as the word limit extension and the reviewers’ clarity regarding the edits required for revision.

 **Every reviewer identified the need for more methodological detail in the main text of the manuscript, and this should be a priority for the revision. In general, as a methods-focused piece and consistent with the recommendations of R1 and R5, I think there needs to be a great deal more step-by-step, detailed guidance on how someone could perform this analysis as a part of their own work .There are many specific areas where greater detail is required, many of which are noted in the reviewers’ feedback. To these examples, I would add my own confusion about how nodes were classified by color (and how the appropriate number of classifications was decided upon) in Figures 1 and 3. I understand that the names of the clusters were assigned manually, but I assume that there was some automated procedure for determining the correct number of classes and which articles belong in each class. I was also confused about how distances between nodes were determined in Figure 3; I assume this
has something to do with the number of papers that cited both articles, but the link strength doesn’t appear visually different in the Figure.**

\*\*We concur that this is an important area of revision, and we thank the Editor for identifying this issue as the first topic to address. The comments from the reviewers also contributed to the main revisions we have made on this topic:

1. Step-by-step citation mapping guidance: We have restructured the Data and Methods section, which now opens with a new “Step-by-Step Flowchart for Implementing Citation Mapping Research” (Figure 1 in the revised manuscript). In the Data and Method section, Figure 1 is followed by a detailed explanation of our approach in each step, in the order of its appearance in the flowchart. We also refer readers to a detailed guide that elaborates on each step in Appendix D. Accordingly, we have significantly revised Appendix D, changing the title from “Basic Guide for Using VOSviewer” to “Detailed Guide for Conducting Citation Mapping Analyses.” The detailed guide that we provide in this revised text includes information on the various options available to scholars in each step of the citation mapping process and advice on how to choose from these options.
2. Mapping and clustering explanation: We have added a new section preceding the Data and Methods section titled “Comparison of Prevalent Techniques.” Here, we discuss VOSviewer’s mapping and clustering techniques with reference to sources that provide detailed descriptions of the mathematical methods behind these techniques and their advantages over other techniques available in bibliometric science (van Eck and Waltman 2014; Waltman, van Eck, and Noyons 2010).
3. Resolution parameter explanation: Specifically, we note that VOSviewer implements a resolution parameter to determine the number of clusters in the maps, represented by distinctive color classifications. The larger the value of this parameter, the larger the number of clusters in the map. When this parameter is set to the default setting of 1.0, as in our study, the clustering equation reduces to the popular and well-known modularity function introduced by Newman and Girvan (2004). However, users can choose to adjust the resolution parameter within VOSviewer’s interface to obtain the level of cluster resolution most useful for their research needs. We note that several studies have shown how adjusting the resolution parameter can yield useful scholarly insights (Fils and van Eck 2018; Waltman, van Eck, and Noyons 2010).
4. Link strength clarification: VOSViewer visually represents the similarity measure between two nodes or their link strength using distances between nodes as well as the thickness of lines connecting the nodes. Following the Editor’s comment about link strength visibility, we used VOSviewer’s viewing preferences to enhance the thickness variation between lines to the maximum and updated the three maps and the relevant text in the manuscript to reflect this visual revision.

 **R1, R2, and R5 all note that the technique described in this paper needs to be compared to alternative methods. In addition to this comparative assessment of value added, the “big picture” of what we can learn from this method and why it’s important for us to use it to study scholarship should be included as part of the revised manuscript (as R1 and R5 suggest in their comments).**

\*\*We agree that this is a core issue and appreciate the opportunity to revise the manuscript to address this concern. This comment correctly identifies that the importance and added value of citation mapping using VOSviewer requires further elaboration. In the revised manuscript, we therefore followed the Editor’s guidance and implemented the following changes:

1. “Big picture” presentation of the importance of the method: We have revised the Introduction section to explicitly explain why visual science mapping is important for the study of scholarship in political science, its added value in relation to traditional literature reviews, and the concrete questions it is ideally suited to answer.
2. Comparison of alternative methods: As noted, we have added a new section following the Introduction titled “Comparison of Prevalent Techniques,” which compares citation mapping using VOSviewer with alternative methods, highlighting VOSviewer’s advantages and added value. In this section, we compare citation mapping with other statistical methods, such as topic modeling. We have also included an assessment of the advancement of artificial intelligence (AI) tools to conduct literature reviews, while noting that AI tools are still in the early stages of development. We further have referred readers to a comprehensive review of AI for literature reviews (Wagner et al. 2022).

To clearly document these revisions, below please find the new text in the Introduction and the section titled “Comparison of Prevalent Techniques,” that address the points above:

Introduction (pp. 1–2)

Visually mapping scientific fields offers a powerful tool to analyze a particular field’s academic landscape. In recent years, comprehensive reviews of scientific fields have become increasingly challenging, as the number of publications has grown beyond human cognitive capacities (Wagner, Lukyanenko, and Paré 2022, p. 209). Traditional literature reviews, which rely on the researchers’ subjective judgment, have generated problems such as in-group citation practices (Zhou, Chai, and Freeman 2024), citation bias (Esarey and Wu 2016), and reliance on conventional indicators of scholarly impact (Ramírez-Castañeda 2020). In addition, many studies no longer attempt to create comprehensive reviews of the literature (Knopf 2006).

Statistical bibliometric methods have been used to remedy some of these difficulties. These methods include systematic search and analysis techniques as well as visualization tools (van Eck and Waltman 2014). Visualizing a scientific field’s universe of publications enables scholars to generate clear images of networks that communicate complex information in a simple form, and provides comprehensive coverage of research fields, reducing the level of subjective judgment (Booth-Tobin et al. 2021). In addition to analyzing a list of topics or cited authors, citation mapping analyzes the relationships between them. Units of analysis include research areas, scholars, institutions, journals, and countries where research originated. Scientific mapping is therefore ideally suited to answer critical questions such as:

1. *What areas of research exist within a scholarly field? How well connected are these areas?* Answering these questions helps researchers achieve objectives such as identifying areas where synergy is needed (Adro and Fernandes 2022), identifying understudied areas (Park et al. 2020), tracing the evolution of a field (Fils and van Eck 2018), and identifying emerging trends (Goncalves et al. 2019).
2. *What studies form the canon of a field?* *What are their main themes and what is the relationship between them?* Answering these questions enables scholars to identify the studies that compose a research area’s canon in a rigorous way, to situate their own research in relation to the general canon, and to identify studies that serve a bridging role, as we have done in the current study.
3. *Which actors and institutions are creating knowledge in the field?* Scientific mapping can analyze relationships between authors, journals, institutions, and countries to draw conclusions about the actors shaping the field (Arora 2024). Such analyses have been used, for example, to guide science policy and funding decisions (Ciarli and Ràfols 2019).

Comparison of Prevalent Techniques (pp. 5–7)

**Comparison of Prevalent Techniques**

Bibliometric methods include searching, analyzing, and mapping techniques. For searching, many studies in political science have employed a basic search string composed of a few core terms determined by the authors (e.g., Boulianne et al. 2023). However, bibliometric experts have found that basic searches may omit important related terms, especially in emerging fields (Huang et al. 2015).

A central challenge in devising more sophisticated methods is balancing between recall and precision (Huang et al. 2015). Each search term may retrieve false positives, as well as false negatives. While false positives can be eliminated manually, false negatives can be identified only by expanding the search. Bibliometric experts have devised semi-automatic techniques that balance recall and precision, using systematic transparent thresholds. These methods tolerate some levels of false negatives and positives, while attempting to minimize both (Huang et al. 2015). We outline the adaptations we implemented in the Data and Methods section. While these adaptations resolve the problem of false positives, the trade-off is that they may miss some relevant results. However, for versatile terms like “organizing,” these adaptations are necessary.

After defining the search and constructing the dataset, bibliometric analysis can be used to explore various types of relationships between publications, including citation, co-authorship, co-citation (two publications that cite the same source, see Small [1973]), and co-occurrence (the appearance of two keywords in the same source). For a comprehensive review of types of relationships that can be analyzed, see van Eck and Waltman (2014). While choosing which relationship to analyze depends on the research objectives, choosing the methods and tools for the analysis involves additional considerations. For example, to identify themes within a research field, scholars have successfully employed topic modeling techniques (Ambrosino et al. 2018). However, topic modeling does not analyze the relationship between themes and does not support the analysis of citation relationships. It also requires full-text access and additional visualization tools.

For scholars interested in visualizing relationships between publications, citation mapping offers a useful solution (van Eck and Waltman 2014). VOSviewer, which uses a unified approach for distance-based mapping and clustering called Visualization of Similarities (VOS) (Waltman, van Eck, and Noyons 2010), has several advantages over the alternatives. Compared to general statistical software, it creates more visually comprehensible maps by overcoming problems such as label overlap (van Eck and Waltman 2010) and circular maps (van Eck et al. 2010). Relative to other bibliometric tools, VOSviewer is well-suited for both map creation and viewing, and integrates files directly from major databases. It also enables flexible viewing settings and an accessible interface that does not require any background in computer science or statistics. In addition, unlike most statistical software packages, VOSviewer is free. These features have made it the most popular software tool for bibliometric mapping purposes (Pan et al. 2018). For a comparison of VOSviewer with other bibliometric mapping tools, see van Eck and Waltman (2010; 2014), Pan et al. (2018) and McAllister, Lennertz, and Mojica (2022).

To determine the number of clusters in the map, VOS implements a resolution parameter. The larger the value of this parameter, the larger the number of clusters in the map. When this parameter is set to the default setting of 1.0, the clustering equation reduces to the well-known modularity function (Newman and Girvan 2004). However, the modularity-based clustering may fail to identify small clusters, whereas the resolution parameter facilitates identifying clusters of varying sizes (Waltman, van Eck, and Noyons 2010, p. 631). Several studies have shown how adjusting the resolution parameter can yield useful scholarly insights (Fils and van Eck 2018; Waltman, van Eck, and Noyons 2010).

In addition to these bibliometric tools, there has been a recent surge of artificial intelligence (AI) tools to assist scholars with literature reviews (Wagner, Lukyanenko, and Paré 2022). AI’s strengths in this domain include complex semantic meaning analysis using natural language processing (NLP) methods and deep-learning capabilities that can potentially learn to replicate researchers’ decisions. However, available AI tools are still in the early stages of development and as yet do not offer a comprehensive solutions suite for science mapping research.

 **R1 asks how we know that the method “succeeded” in recovering the correct or optimal structure of relationships among publications and the full or correct universe of relevant publications to be studied. I had a similar question when I read the paper: we may be able to (by, e.g., manual verification) rule out “false positives” (articles that the method identifies as being relevant when they are not) in identifying relevant articles as is done in this manuscript, but this sort of verification would not avail in the identification of “false negatives” (relevant articles that the method does not identify as such and that are therefore left out of the mapping). How could we assess the robustness of the method on this dimension? If it can’t be done in practice, this limitation of the method should be highlighted in the revised version of the paper.**

\*\*We agree that it is important to assess the success of the method in the manuscript. As the Editor points out, there are two levels at which this issue should be addressed. The first relates to the recovery of the optimal structure of relationships among publications (the mapping strategy), and the second relates to the retrieval of the full and accurate universe of publications and identification of false negatives (the search strategy). We have addressed these two levels in the new section in the manuscript, “Comparison of Prevalent Techniques” (see highlighted text above), which is documented in full in the highlighted text above.

1. Evaluating the mapping strategy: As can be seen in the highlighted text above, we have elaborated on VOSviewer’s mapping and clustering techniques. Here we cite sources that explain the advantage of these techniques over alternative bibliometric mapping techniques, and why we believe they produce the optimal structure of relationships among publications.
2. Evaluating the search strategy: In the highlighted text above, we discuss the trade-off between recall and precision in bibliometric search methods and note some of the optimal solutions developed by bibliometric scholars, which all accept some level of false positives and false negatives. We further explain why, given the generic and versatile quality of terms like “organizing,” these optimal solutions required us to apply adjustments that increase precision but may also result in more unidentified false negatives.

 **This manuscript is closely related to a forthcoming article in the Annual Review of Political Science; this connection (and the ways in which the two manuscripts complement each other) should be explicitly noted in the paper (with redacted author names in the blind version for review). In particular, some of the reviewers’ questions about the specific application of scholarship on “organizing” might be dealt with in the manuscript with references to the other article (and by quoting this article in the response memo to reviewers).**

\*\*Thank you for this comment. We agree that the link between the papers should be made explicit and that the added value of the current paper in relation to the *ARPS* paper should be noted. We therefore have revised the section previously titled “Defining Organizing,” changing its title to “Organizing as a Case Study,” and have added the following information in that section:

1. Knowledge gaps: The specific gaps in the scholarship on “organizing” that exist today.
2. *ARPS* article: How the *ARPS* article has addressed these gaps and the contribution of the citation map that is included in it.
3. Current paper added contribution: What the current paper adds in terms of knowledge about scholarship on organizing and in terms of knowledge about the application of citation mapping methodologies in political science.
4. Research questions: The research questions of the current paper, which we address by using citation mapping.
5. Presenting the answers: We have revised the Results section to show how the maps answer the specific questions that we laid out in the Organizing as a Case Study section.

To clearly document these revisions, we included below the new text in the Organizing as a Case Study section that addresses the points above:

Organizing as a Case Study (pp. 3–4):

**Organizing as a Case Study**

We demonstrate the capabilities of citation mapping using the term “organizing” in the context of political action. We focus on this term because there has been a recent surge in research on this topic (see Appendix C), yet the meanings attributed to it have been so diverse that its meaning has become opaque (Han, McKenna, and Oyakawa 2021). Recently, given fears of democratic erosion in advanced democracies, scholars have found a renewed interest in organizing as a central pillar of democracy (Han, McKenna, and Oyakawa 2021; Woodly 2021).

A recent review of organizing focuses on the U.S. context and differentiates the strategic logic that underlies organizing in comparison to other types of collective action (Authors forthcoming). Using a citation map of scholarship on organizing in the United States, the review identifies central areas in the literature. The current study adds to this work in three main ways. First, we provide a methodological description of citation mapping. Second, we expand the geographical scope of the mapping to include global scholarship on organizing beyond the U.S. context. Third, we present additional types of citation maps and analyses of organizing and democracy that provide methodological guidance to researchers seeking to implement these techniques in their research.

To this end, we define the following three research questions in our illustrative analysis of organizing and democracy, which we answer through citation mapping techniques:

1. What thematic areas and sub-areas of scholarship exist globally that have studied organizing as a distinct concept? (RQ1, “Thematic areas”). This question also draws our attention to the relationship between these thematic areas in terms of their level of autonomy and interdependence.
2. Which of these areas includes substantial research on the connection between organizing and democracy? (RQ2, “Organizing and democracy”). Answering this question also clarifies which areas do not currently focus on this connection but could do so in the future.
3. What themes exist in the canonical literature on organizing, how do they relate to each other, and which key studies belong to each theme? (RQ3, “Canonical literature”). Answering this question helps position future research on organizing in relation to core theories.

**Reviewers' comments:

Reviewer #1: Paper makes the case that political scientists should use citation mapping/network tools more frequently than is current practice.  Authors give some general motivation for the practice, and then a worked example for "organizing" (in the social movement sense) in political science.  Authors demonstrate various different extensions/auxiliary uses of the method that might be of interest.

Overall, the paper is well-written and straightforward to follow.  I think there is an audience for this in political science, although the paper could do with refocussing.   In particular, I think the authors either want to guide researchers through the process generically (a tall order in 4k words) or spend more time explaining what they think they learn from the worked example specifically.  I also think the case could be made stronger by considering why scholars don't use these techniques at the moment---and thus the extant practice (and its problems).  Some comments follow below.

Ultimately, I would be happy to see the authors receive an opportunity to revise-and-resubmit, should the editor agree with my assessment.**

\*\*Thank you for this recognition of the paper’s contribution. We agree that the issues noted can be addressed to improve the value and significance of the study’s contribution.

 **# Comments to the authors.

1. Framing/pitch
At the moment, the paper tries to do two related things:
1 introduce, in some general/abstract sense, the idea that political scientists should do citation mapping and give high-level advice for the same
2 show how it would work for a term like "organizing"

This is a short article, I would encourage refocussing almost solely on (2). The main reason for this is that otherwise it's hard to get a grip on exactly what these methods offer.

For example, in the Intro at the moment, the authors argue that these methods...
- help us "grasp...academic landscape on a larger scale"
- "reaching new insights"
etc
But this is all very vague, and true of many techniques (more on this below).  It would be better just to explain \*what\* \_exactly\_ one would like to understand about "organizing" and then show how the methods used get us there.**

\*\*Thank you for this important observation and suggestion. The revised manuscript refocuses the paper by clarifying both why scholars should use citation mapping and what we can learn about “organizing” that we do not already know by using citation maps. The revisions that support this refocus are as follows and can be found in the highlighted texts included in earlier in this response:

1. “Big picture” presentation of the importance of the method: We have revised the Introduction section to explicitly explain why visual science mapping is important for the study of scholarship in political science, its added value in relation to traditional literature reviews, and the concrete questions that it is ideally suited to answer.
2. Comparison of alternative methods: We have added a new section following the Introduction section titled “Comparison of Prevalent Techniques” (see highlighted text above), which compares citation mapping using VOSviewer with alternative methods, highlighting VOSviewer’s advantages and added value. In this section, we have compared citation mapping with other statistical methods like topic modeling, and other citation mapping visualization software. We have also included an assessment of the advancement of AI tools to conduct literature reviews, while noting that AI tools are still in the early stages of development.
3. What we can learn about “organizing” using citation mapping: We have revised the section previously titled “Defining Organizing,” and changed its title to “Organizing as a Case Study.” Here we elaborate on what citation maps add to current knowledge on the topic and what unanswered questions they help us answer. Specifically, we refer to a forthcoming article in the *American Review of Political Science* titled “Organizing and Democracy: Understanding the Possibilities for Transformative Collective Action.” The *ARPS* article includes one citation map that focuses exclusively on research on organizing in the United States and was developed in parallel to the current study. We explain the contribution of that map to the *ARPS* article, the contribution of the current study’s maps beyond the *ARPS* article, and the contribution of the current study to knowledge about the methodologies used to create the maps.

 **2. Comparisons to Extant Techniques
Space is short, but it would nonetheless helpful to know
- exactly what we want to know about "organizing" that we cannot know with extant techniques -- what \*exactly\* are we unsure about or missing?
- what are the extant techniques for studying those things?  Authors talk about "themes" in various places, and I'd assume a topic model could get us there (indeed, that's what a lot of people use topic models for).  What's wrong with that instinct?
- how do you know if the visualization/discovery was a "success"?  This is a notorious problem, of course.  Some have suggested notions of "usefulness" by users.  See e.g.

Grimmer, Justin, and Gary King. "General purpose computer-assisted clustering and conceptualization." Proceedings of the National Academy of Sciences 108.7 (2011): 2643-2650.

Personally, I don't find those sorts of benchmarks especially convincing, but right now the authors offer nothing at all on this front.**

\*\*This comment raises three interrelated and much appreciated concerns. The first relates to the identification of gaps in the knowledge about “organizing” that the study seeks to address, the second relates to a comparison of the citation mapping technique using VOSviewer to extant techniques, and the third relates to an assessment of the success of the VOSviewer mapping technique. We also thank the reviewer for pointing out the relevant debate about success benchmarks and the Grimmer and King (2011) resource which discusses usefulness as a benchmark. We address each of these concerns in order:

1. Unanswered questions on “organizing:” We articulate the questions that the current study seeks to answer about “organizing” in the revision of the section that we have retitled “Organizing as a Case Study” (see highlighted text above). In this section, we elaborate on what citation maps add to current knowledge on “organizing,” with specific reference to the forthcoming article in the *American Review of Political Science* mentioned above, which includes one citation map that was developed as part of the current study. We then present how the current paper adds to the *ARPS* article both regarding the citation mapping methodology and in terms of new knowledge about “organizing.”
2. A reviewandcomparison of extant techniques: We review prevalent techniques used to address these types of questions in a new section titled “Comparison of Prevalent Techniques” (see highlighted text above), which compares citation mapping using VOSviewer with alternative methods, highlighting its advantages and added value. We note that VOSviewer produces maps that are visually clearer and easier to interpret than some of the alternatives and that it provides the user with flexible settings options that facilitate the creation of relevant maps for a variety of scholarly applications. Regarding the topic modeling alternative, we note that while topic modeling is ideal for identifying themes in a research field, citation mapping provides additional techniques and tools to identify the relationships between topics and to generate visual maps that represent these relationships. In comparison to topic modeling, citation modeling has the added value of identifying citation relationships between publications, authors, references, research institutions, and countries.
3. Assessment of the method’s clustering success: We have addressed this concern in the new section “Comparison of Prevalent Techniques” (see highlighted text above), where we elaborate on VOSviewer’s mapping and clustering techniques. Here we cite sources that explain their advantage over alternative bibliometric mapping techniques, and why we believe they produce the optimal structure of relationships among publications. We note that VOSviewer implements a resolution parameter to determine the number of color classifications (clusters) in the maps. The larger the value of this parameter, the larger the number of clusters in the map. When this parameter is set to the default of 1.0, as in our study, the clustering equation reduces to the popular and well-known modularity function introduced by Newman and Girvan (2004). However, like the argument made in Grimmer and King (2011), users can adjust the resolution parameter within VOSviewer’s interface to obtain the level of cluster resolution most useful for their research needs. In the manuscript, we note that several studies have shown how adjusting the resolution parameter can yield useful scholarly insights (Fils and van Eck 2018; Waltman, van Eck, and Noyons 2010).

 **3. Generality of Advice
The authors do a nice job of explaining what \*they\* did on p3/4/5, but it's very hard for me to know how general these lessons are.  Suppose I care about "Congress", should I also do "targeted lexical search" or does it depend on my sense of the number of "mainly irrelevant results"?

Similarly, should I also "manually vet[ted] all search results"?  What if there's 10000? Appendix H suggests it's a \*lot\* of work (!)

Should I use the VOSviewer too?  It seems to be free, but not open-source -- is that a good choice to be recommending?  What else could I use?

If the authors don't have firm advice here, I would refocus in the way I noted above.  If they \*do\* have firm advice, they should give it, and perhaps write everything down as a framework/steps/flowchart**

\*\*We appreciate this suggestion to include more generalized advice and practical steps to guide scholars studying a variety of topics. We have added this guidance in the revised manuscript by restructuring the Data and Methods section, which now opens with a new “Step-by-Step Flowchart for Implementing Citation Mapping Research” (Figure 1). In the Data and Method section, Figure 1 is followed by a detailed explanation of our approach in each step, in the order it appears in the flowchart. We also refer readers to a detailed guide that elaborates on each step in Appendix D. Accordingly, we have made major revisions to Appendix D, which was previously titled “Basic Guide for Using VOSviewer,” and is now titled “Detailed Guide for Conducting Citation Mapping Analyses.” The detailed guide that we provide in this revised text includes information on the various options available to scholars at each step of the citation mapping process, and advice on how to choose between these options.

 **4. Results and expectations
Because the specific research question is never stated, it's hard to know what to update from the Results sections.  Some questions to guide the rewrite:
- is Fig 1 "surprising" or as expected given your priors?  what did you \*learn\* (that you perhaps didn't know before)?  how did what you \*learn\* depend on the particular parameter settings you used? Not to put too fine a point on it, but saying that there are "thematic clusters" is not (from my POV) a finding---we would be shocked weren't, I think.**

\*\*Thank you for this important comment. We have addressed this first by clearly stating the knowledge gaps about organizing that this paper seeks to address in the revised and retitled “Organizing as a Case Study” section (see highlighted text above). We subsequently revised the Results section to explain precisely how the citation maps provided answers to these questions. We agree that locating thematic clusters is not itself an interesting finding; however, the maps provide a way to assess the relationship between the clusters. This capability enabled us to identify potential lacunas (e.g., sub-areas of research where the relationship between organizing and democracy has been understudied), to map the structure of the canonical literature, and to help scholars situate future research. These insights have been highlighted in the revised Results section in the manuscript.

 **- In the discussion of Fig 2, what is the power of the comments re the rank of "democracy"? (23rd) Other things were presumably higher and lower, so why discuss this entry?  Again, what's the null hypothesis here?  Or how does seeing "democracy" understand organizing?**

\*\*This topic indeed merits further explanation in the article. We have addressed this by revising the text in two locations:

1. Research questions on organizing and democracy: In the Organizing as a Case Study section (see highlighted text above), we explain why the connection between organizing and democracy has been important for scholars. We then set out the research questions that this study seeks to address through citation mapping (p. 4):

Which of [the research] areas [on organizing] includes substantial research on the connection between organizing and democracy? (RQ2: “Organizing and democracy”). Answering this question also clarifies which areas do not currently focus on this connection but could do so in the future.

1. Stating the answer: In the subsection “Organizing and Democracy” of the Results, section, we have revised the text to reflect the fact that this subsection answers the aforementioned research questions through citation mapping and by exploiting VOSviewer’s viewing options, which allow the researcher to focus on one keyword and view its relationship to other keywords and clusters in the map. In accordance with the reviewer’s suggestion and to enhance the focus of the paper, we have removed the text about the ranking of “democracy” compared to other terms, and instead have focused on presenting the sub-areas in which its relation to organizing has been understudied.

 **- In the discussion of Fig 3, what lessons do we draw from the citation patterns -- I don't mean the description of them (which seems fine), I mean how, specifically, is this helpful to scholars in the area (which I took to be the broad motivation for the exercise)?**

\*\*Thank you for this insightful question. Similar to the question above about “democracy,” we have addressed this question by revising the text in two locations in the manuscript:

1. Research questions: In the Organizing as a Case Study section, we explicitly set out the research questions on “organizing” that the co-citation map subsequently answers. The research questions related to the co-citation map are (p. 4):

“What themes exist in the canonical literature on organizing, how do they relate to each other, and which key studies belong to each theme?” (RQ3: “Canonical literature”)

1. Stating the answer: In the “Canonical Literature” subsection of the Results, we refer back to the research questions that the co-citation map addresses and show how the map answers these questions. We further refer readers to a new Appendix section, titled “Appendix I: Description of Canon Clusters.” In this new section we elaborate on the content and central concepts of each canonical cluster, its relationship to other canonical clusters, and the relationship between some of the clusters to the study of organizing and democracy.

 **The paragraph starting "Three of the clusters..." seems especially ambiguous in this context.  I think the fact that the keywords and not the same as the citations potentially indicates some sort of discovery but the authors don't really comment on it (I note the passing sentence on p13).  As an end-user, which version of the network is likely more useful or "truer" as a representation of reality?**

\*\*This is an important observation which requires clarification in the manuscript. We initially addressed this question briefly in the Conclusion section, where we hypothesized that the differences in the themes of the clusters between the co-occurrence map (Figure 2) and the co-citation map (Figure 4) are due to the temporal evolution of the field. Newer areas of research, such as race and gender, might not yet have consolidated a clearly demarcated canon. We further offered this hypothesis as a future research direction that could be addressed using citation mapping. As Reviewer 1 suggested, to avoid the ambiguity of that finding in the Results section, we have moved the paragraph that addresses this issue from the Conclusion to the Results section, where that finding is described. In addition, in the Results section, we have added an explanation about the clusters that appear in the co-citation map (Figure 4) but not in the keywords co-occurrence map (Figure 2). We conclude that some of the thematic sub-fields draw upon more than one area of canonical literature.  **Reviewer #2: Suggested decision: accept with minor revisions

This innovative paper explores the underutilized method (in political science) of citation mapping. It demonstrates the method's capability through citation maps of research on the term "organizing." This approach, the authors show, reveals insights about themes, gaps, and degree and type of exchange across subliteratures in the field of organizing studies. The paper is creative and methodologically sound, offering a novel way to synthesize and visualize complex concepts in social science research.**

\*\*Thank you for this acknowledgement of the paper’s contribution.

 **I have a couple of suggestions for strengthening the manuscript. First, to underscore the contribution that the paper is making, the authors should consider adding a more systematic and comprehensive comparison between traditional literature review practices and citation mapping. Given known problems with in-group citation practices, citation inequality, and the deficiencies of conventional indicators of scholarly impact, the authors could more explicitly address whether and how this approach helps correct for some of the known biases of status quo practices. This revision would further highlight the study's implications and contributions.**

\*\*Thank you for these important insights. We acknowledge the need to compare our citation mapping approach to prevalent literature review methods. We address this need in two locations in the text:

1. “Big picture” presentation of the importance of the method: We have revised the Introduction section to explicitly explain why visual citation mapping is important for the study of scholarship in political science and its added value in relation to traditional literature reviews, specifically in relation to problems such as in-group citation practices, citation inequality, and the deficiencies of conventional indicators of scholarly impact.
2. Comparison of alternative methods: We have added a new section following the Introduction section, titled “Comparison of Prevalent Techniques” (see highlighted text above), which compares citation mapping using VOSviewer with alternative methods, highlighting its advantages and added value. In this section, we compare citation mapping with other statistical methods, such as topic modeling.

 **The section of the article on limitations could also be expanded—and perhaps added to the end of the piece to address not only the limitations of the specific dataset introduced here, but also disadvantages of the method itself. Particularly in an age of generative AI, where tools like Research Rabbit (**[**https://www.researchrabbit.ai/**](https://www.researchrabbit.ai/)**) allow plug-and-play tools to visualize author networks and map connections among papers and whole literatures, this paper has the potential to establish some methodological guardrails for scholars interested in, or already using, these mapping tools.**

\*\*We agree that the limitations of our approach should be addressed in the manuscript, and that they relate to the advancement of AI tools. We have addressed this by implementing the following two revisions:

1. Limitations of approach: In the Data and Methods section, we have added text that generally acknowledges the limitations of our approach. We then refer readers to a new section on limitations included in the majorly revised Appendix D, the title of which we have revised from “Basic Guide for Using VOSviewer” to “Detailed Guide for Conducting Citation Mapping Analyses.” We have moved the section on dataset limitations to the revised Appendix D, where we have added further limitations of the methods, including the time-intensive task of vetting and the possibility of missing relevant articles (“false negatives”).
2. Assessment of AI tools: In the new section “Comparison of Prevalent Techniques” (see highlighted text above), we have added an assessment of the advancement of AI tools to conduct literature reviews. Here we reference a comprehensive review of such tools (Wagner et al. 2022), highlighting where such tools may be useful in the future to expedite time-intensive tasks and enhance replicability. However, we note that AI tools are still in the early stages of development, and as yet do not offer a comprehensive solution suite for science mapping.

**Reviewer #3: This study employed co-occurrence maps and co-citation maps to characterize the development of organizing. The focus of the study lies more in the results obtained from the terms map and co-citation map rather than the tool itself. Consequently, using the title "Citation Mapping: A Powerful Tool for Producing and Visualizing Data-driven Reviews of Research Fields" might introduce ambiguity, as citation mapping is just one facet of the methods utilized in this research.**

\*\*Thank you for this valuable comment. Indeed, we agree that the paper merited a refocus that would better reflect its title and orient it towards the tools and methodology. We have revised the manuscript to achieve this refocusing by implementing the following edits:

1. “Big picture” presentation of the importance of the method: We have revised the Introduction section to explicitly explain why visual science mapping is important for the study of scholarship in political science, its added value in relation to traditional literature reviews, and the concrete questions it is ideally suited to answer (see highlighted text above).
2. Comparison of alternative methods: We have added a new section following the Introduction section titled “Comparison of Prevalent Techniques” (see highlighted text above), which compares citation mapping using VOSviewer with alternative methods, highlighting its advantages and added value. In this section, we compare citation mapping with other statistical methods like topic modeling, and other citation mapping visualization software (see highlighted text above).
3. Step-by-step citation mapping guidance: We have restructured the Data and Methods section, which now opens with a new Step-by-Step Flowchart for Implementing Citation Mapping Research (Figure 1 in the revised manuscript). In the Data and Method section, we follow Figure 1 with a detailed explanation of our approach in each step in the order it appears in the flowchart. We also refer readers to a detailed guide that elaborates on each step in Appendix D. Accordingly, we have made major revisions to Appendix D, which was previously titled “Basic Guide for Using VOSviewer,” and is now titled “Detailed Guide for Conducting Citation Mapping Analyses.” The detailed guide that we provide in this revised text includes information on the various options available to scholars in each step of the citation mapping process, and advice on how to choose from these options.
4. VOSviewer’s mathematical techniques*:* in the new section titled “Comparison of Prevalent Techniques” (see highlighted text above), we discuss VOSviewer’s mapping and clustering techniques. Here we refer readers to sources that provide a detailed description of the mathematical methods behind these techniques and their advantages over other techniques available in bibliometric science (van Eck and Waltman 2014; Waltman, van Eck, and Noyons 2010).
5. Limitations: In the Data and Methods section, we have added text that generally acknowledges the limitations of our approach, and refer readers to a new section on limitations included in Appendix D. This revised Appendix section includes information on dataset limitations, time-intensive tasks, and the possibility of missing relevant articles (“false negatives”).

**It's noted that the classic publication on co-citation by Small (1973) has been absent from the manuscript:**

**Small, H. (1973). Co-Citation in the Scientific Literature: A New Measure of the Relationship between Two Documents. Journal of the American Society for Information Science, 24, 265-269.**

\*\*Thank you for this valuable suggestion. We have included this reference in the new “Comparison of Prevalent Techniques” section (see highlighted text above), next to the first appearance of the term “co-citation” in the manuscript on p. 5:

After defining the search and constructing the dataset, bibliometric analysis can be used to explore various types of relationships between publications, including citation, co-authorship, co-citation (two publications that cite the same source, see Small [1973]),

 **In the "Data and Methods" section, the authors introduced the method of extracting relevant results on "organizing" and the software used but omitted details about the data analysis method, such as the co-occurrence map.**

\*\*Thank you for pointing out this gap in the exposition of the methodological details. We consequently added information about the data analysis method in the Data and Methods section. Specifically, we have added a subsection titled “Maps Analysis,” (p. 10) where we indicate that we follow common practice in the field by manually labeling the clusters in terms of themes in both the co-occurrence and the co-citation maps based on observing the list of terms/references in each cluster and their frequencies, as well as more details on the analysis method.

 **Is there a missing subsection title after the "Results" section? The content related to Figure 1 appears to be unassigned to any specific section.**

\*\*Thank you for pointing this inconsistency. We have added a subtitle “Thematic Analysis” below the title of the Results section (p. 11).

 **Regarding Figure 1, the robustness of the clustering is called into question, particularly as the purple nodes appear dispersed and mixed with nodes from other clusters.**

\*\*We appreciate this comment and agree that the mapping and clustering technique merits more details in the manuscript. We therefore have added a paragraph (p. 6) that discusses VOSviewer’s mapping and clustering techniques and refers readers to sources that provide a detailed description of the mathematical methods behind these techniques. In that paragraph, we note that VOSviewer implements a resolution parameter to determine the number of color classifications (clusters) in the maps. The larger the value of this parameter, the larger the number of clusters in the map. When this parameter is set to the default setting of 1.0, as in our study, the clustering equation reduces to the popular and well-known modularity function introduced by Newman and Girvan (2004). However, users can choose to adjust the resolution parameter within VOSviewer’s interface to obtain the level of cluster resolution most useful for their research needs. We also document that several studies have shown how adjusting the resolution parameter can yield useful scholarly insights (Fils and van Eck 2018; Waltman, van Eck, and Noyons 2010).

Additionally, we note here that VOSviewer’s algorithm prioritizes representing relationships by distances between nodes rather than by the clusters that are associated with nodes. This prioritization was chosen because it represents relationships more accurately, but it may result in clusters that are scattered or intermingled with other clusters.

 **The rationale behind using both co-occurrence maps and co-citation maps is not explicitly clarified. It would be beneficial for the authors to elucidate the logic behind employing these two components in the study. Providing insights into how these elements complement each other in achieving the research objectives would enhance the clarity of the methodology.**\*\*Thank you for this important comment. We address this question in three places in the revised manuscript:

1. Stating the research questions: We clearly set out the research questions about organizing that this paper seeks to address in the revised and retitled “Organizing as a Case Study” section (see highlighted text above).
2. Map choice: In the Data and Methods section, we state that we chose the maps because they are useful in addressing the study’s research questions.
3. Results: We have revised the Results section to state precisely how the two chosen citation maps provided answers to these questions.
 **Reviewer #5: I hope that the authors are having a great start to 2024. It was a pleasure reading their manuscript since I generally think we need more meta-science work on the discipline. I like this manuscript particularly because it talks about a tool, citation mapping, that isn't widely used. Frankly, I've looked into it a few times and haven't known where to started - and I'm very comfortable with new tools and tech. So I think that this paper has the potential to be very useful as a guide.**

\*\*Thank you for reviewing the paper thoroughly and acknowledging its contribution.

 **I have several questions and comments about the manuscript, though. I offer them with the hope that they might help the authors strengthen their paper and increase it's usefulness and impact. They are listed below in no particular order.**

 **- I've read the paragraphs on the noise ratio and your modified version, the hit ratio, twice and don't understand how these are implemented. Please explain more.
- One reason why I might not understand this I don't use the Web of Science. I actually don't know any coauthors who do. We probably should. But this means that I don't understand the mechanics of these searchers in WoS. Some more background here would be helpful.**

\*\*Thank you for pointing out these sections of the methodology that require clarification. We aim for the paper to be coherent and accessible to all political scientists, and it is therefore very important to us that the methodology is explained such that colleagues can easily understand and implement the techniques described in it. We have made the following revisions to the Data and Methods section to reflect this aim:

1. Step-by-step guidance: We have added a new opening that includes a flowchart setting out a step-by-step process of conducting a citation mapping analysis on a variety of terms (Figure 1). In the Data and Method section, Figure 1 is followed by a detailed explanation of our approach during each step, in the order in which the steps appear in the flowchart. We also refer readers to a detailed guide that elaborates on each step in Appendix D. Accordingly, we have significantly revised Appendix D, changing the title from “Basic Guide for Using VOSviewer” to “Detailed Guide for Conducting Citation Mapping Analyses.” The detailed guide that we provide in this revised text includes information on the various options available to scholars at each step of the citation mapping process, and advice on how to choose from these options.
2. Explanation of hit ratio: We have revised the text that explains the modified hit ratio to make it clearer to readers. The revised explanation states that:

The “hit ratio” is the proportion of relevant results out of the 10 most cited records retrieved when searching for the candidate term. Following the expanded lexical search (Huang et al. 2015), we applied a 70% threshold to determine whether to include or exclude each contingent term. That is, for each candidate term, if seven or more of the ten most cited results were relevant, the term was included. We manually determined the relevancy of results based on core definitions from the literature (Appendix H) (p. 8).

 **- I didn't know what VOSviewer was so I looked it up. I'd mention that it's free software in the paper, since that might be helpful info, particularly for folks at under-resourced places.**

\*\*This is an important point and we have added this information to the text.

 **- Now that the authors have shown me and interpreted for me Figure 1, I want to make something similar for some of my new work. I think that identifying the groupings of literature on an overall topic is interesting and should help researchers identify what they might be missing in their work. In prior years, political scientists might have been able to ignore some lit, but as folks in the field are increasingly aiming their papers at more general journals (PNAS, etc.), I think that getting this sense of the lit will be even more helpful.**

\*\*We are pleased to read that you recognize the value of our citation mapping approach for political scientists and how it can help them obtain a more comprehensive view of the literature in their field.

 **- Please make Figure 3 much larger. Also, if possible, please add a white border around the black text or do something else to make the citations more legible.**

**\*\***We appreciate this attention to the visual clarity of the maps. We have changed the fonts in the map to make the citations more legible and have increased the map size. In our prior experience publishing citation maps, we have worked closely with the journal’s production team to enhance the readability of the maps. Should the manuscript be accepted for publication, we would be pleased to do the same for this article.

 **- I'm on page 10 now and have appreciated the walk through to this point, but I'm less sure how this helps me create better research. Perhaps the authors could use a motivating example of a research project on organizing and show how each figure provides insights that would help project development. Like come up with a research questiona and walk through a simulated lit review this way and show how this approach might lead to a different theoretical viewpoint or understanding of key concepts.**

\*\*Thank you for this observation regarding the importance of demonstrating how citation mapping can help researchers create better research. To do this, we have implemented the following revisions:

1. What we can learn about “organizing” using citation mapping: We have revised the section previously entitled “Defining Organizing,” and retitled it “Organizing as a Case Study,” setting out the specific research questions that this paper seeks to answer using citation maps. We also refer to a forthcoming article in the *American Review of Political Science*, “Organizing and Democracy: Understanding the Possibilities for Transformative Collective Action.” The *ARPS* article includes one citation map that focuses exclusively on research on organizing in the United States and that was developed in parallel to the current study. We explain the contribution of that map to the *ARPS* article, the contribution of the current study’s maps beyond the *ARPS* article, as well as the contribution of this current study to knowledge about the methodologies used to create the maps, which was not included in the *ARPS* article (the *ARPS* article cites a conference version of the current study for information on the methodologies used to create the map).
2. Revised Results section: We have revised the Results section to explain precisely how the citation maps provide answers to the research questions. We explain that the maps provide a way to assess the relationship between the clusters, which enabled us to identify potential lacunas, to map the structure of the canonical literature, and to help scholars situate future research in relation to the canon.

 **- Another way of thinking about my comment above is - what's the specific value added here compared to the status quo?**

\*\*This question indeed merits further elaboration in the manuscript. We clarified the added value of our approach by implementing the following revisions:

1. “Big picture” contribution of citation mapping: We have revised the Introduction section to highlight why visual citation mapping is important for the study of scholarship in political science and its added value compared with the traditional literature review.
2. Comparison of alternative methods: We have added a new section titled “Comparison of Prevalent Techniques” (see highlighted text above) that compares citation mapping using VOSviewer with alternative methods, including topic modeling and other visual mapping tools, highlighting its advantages and added value. We also have added an assessment of the advancement of AI tools to conduct literature reviews with reference to a comprehensive review of such tools (Wagner et al. 2022). We highlight where such tools may be useful in the future. However, we note that AI tools are still in the early stages of development, and thus do not as yet offer a comprehensive solution suite for science mapping.

 **- In the appendix, you mention that WoS doesn't have great book coverage. Does that mean that this approach might be better for some applications and literature than others? Could you talk about that?**

\*\*This is an important point that readers should be aware of regarding WoS’s coverage and shortcomings. We therefore have added text in the Data and Methods section that acknowledges the limitations of our approach. Here we refer readers to a new section on limitations included in Appendix D, which we revised from its previous title “Basic Guide for Using VOSviewer” to the new title “Detailed Guide for Conducting Citation Mapping Analyses.” We moved the section on dataset limitations to this expanded Appendix D. There, we state that using WoS may be less useful in fields that rely primarily on books as their main form of academic publications.