Disagreement as context for science-civic learning: an analysis of discursive resources brought to bear by high school science students

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Abstract
Amid a broader sociopolitical milieu of division, disagreement, and uncivil debate, this study investigates instances of disagreement among students in a high school science classroom as they attempt to answer the civic question of what should we do about climate change, a long contentious topic in the USA. Using a theoretical framework that frames relational practices and ideological positions as discursive resources, this study analyzes the resources youth bring to bear within disagreement. Through discourse analysis and qualitative coding of naturalistic moments of disagreement, this study shows that youth leverage diverse constellations of discursive resources when disagreeing over science-civic matters. From this analysis, I suggest paths forward in terms of research and practice in efforts to prepare young people for science-civic participation that will inevitably involve disagreement with others in one’s community.

Keywords Civic participation · Science practices · Ideology

Amid mounting problems stemming from rapid technological, environmental, and societal change, scholars have called for education to shift toward preparing youth for informed civic participation (Lee, White and Dong 2021). Contending that school should help students learn to navigate the civic question of what should we do? this argument highlights both the daunting task of confronting complex problems facing society and the need to do so as a community. Echoing this and similar calls from scholars of science education (e.g., Roberts 2007), I argue that the central civic question—what should we do?—should serve as an orienting goal of science education. To prepare young people to be able to answer this question in ways that draw on scientific ideas and practices should be a key focus of classroom-based science learning, particularly as we encounter with increasing
frequency science-intertwined civic issues, such as a changing climate and the spread of novel disease.

Yet, this task is neither simple nor straightforward. As can be seen in our current socio-political context, answering the question of what should we do about many science-related issues often leads to contention and disagreement. One needs to look no further than debates currently erupting in the USA over mask and vaccination mandates in the face of a deadly pandemic to see that this disagreement tends to be uncivil, unproductive, and inspiring of further, deeper divisions (e.g., Romo 2021). Around and beyond COVID-19, youth are exposed to adults disagreeing in uncivil ways in public forums—from social media posts to the comments section of local newspapers to formal debates among candidates for the nation’s highest political office. Perhaps worse, this incivility has been normalized. While many might wish it were the case, science does not exist in a separate world but rather is firmly embedded in this sociopolitical landscape of disagreement. In light of this sociopolitical context, I argue that we need to prepare youth to disagree, yet to do so in productive ways. Disagreement over civic matters is inevitable; hostility perhaps need not be.

Notions of science literacy should account for widespread uncivil debate, and they currently do not. We tend to prepare students for a world that does not exist and perhaps never has—one in which applying scientific ideas is a straightforward and noncontroversial process. This approach needs to change; instead, we must help youth learn to disagree over science-related civic issues in ways that are productive—that do not inspire further, deeper, and more hostile contention and that still support the epistemological roots of science. This study offers a first step in such a direction by examining what youth actually do in disagreement while attempting to respond to the civic question of what should we do? This study asks about the discursive resources that high school science students bring to bear within disagreement arising in classroom discussion about climate change, a contentious issue in the USA. It aims to understand how the deployment of various resources by learners might contribute to or inhibit science learning within the context of disagreement, an omnipresent feature of the divided modern world.

**Background and motivation: disagreement in and for science learning**

Science relies on disagreement to develop robust understandings of the world, given argumentation as a core activity of professional scientists (Driver, Newton and Osborne 2000). The enterprise of science necessitates disagreement, as scientists weigh evidence, assess claims, and evaluate competing theories to develop increasingly coherent explanatory models (Latour and Woolgar 1986). This centrality of disagreement is reflected in contemporary approaches to science education, in which argumentation has become a major focus, evidenced by its codification in standards, such as the US Next Generation Science Standards (NGSS; Achieve 2013) and significant attention in science education research (Allchin and Zemplén 2020). This focus has translated to opportunities for students to engage in scientific argumentation and debate with peers in science classrooms.

Yet, while this turn toward argumentation highlights the centrality of disagreement to science, it does not necessarily account for the disagreements we experience as members of society outside of science classrooms, particularly when we attempt to answer the civic question of what should we do? Rather, these sorts of disagreements, even when they might be in response to issues of science, tend to rely on values, positions, and argumentative practices that are often not scientific (Feinstein and Waddington 2020).
Some research has ventured into this terrain. In particular, research in socio-scientific issues (SSIs) has demonstrated that students draw on moral and ethical reasoning to make sense of complex issues bridging science and society (Zeidler, Herman and Sadler 2019). This drawing on resources not traditionally scientific can be generative toward students’ science literacy (Sadler, Barab and Scott 2007) as well as their moral sensitivity (Fowler, Zeidler and Sadler 2009). Similarly, other areas of scholarship have argued for engaging students in learning through controversial issues. While much of this work has studied non-science classrooms (e.g., McAvoy and Hess 2013), scholars have called for the integration of such issues into science class, with some evidence demonstrating the possibility of learning scientific concepts and practices through confronting controversial issues in the science classroom (Walsh and Tsursaki 2014).

Yet, while it is assumed that disagreements occur among students as they navigate contentious issues—and that such disagreement is important to learning—scholars have not explicitly confronted preparing students for moments when they disagree within such decision making. There has not been sufficient attention given to the interactional space within the inevitable moments of disagreement among students as they engage with contentious science-related issues. Few studies, if any, center the disagreement that unfolds between participants in discussion as they engage in deliberation about a civic matter around which they hold differing views. The present study thus advances this body of work by focusing on disagreement itself as a reality of our modern world. It builds understanding of interactional dynamics within disagreement among youth over science-related civic matters to explicitly address how we might prepare young people to draw on science in a contentious world.

**Study purpose**

There is little research-based knowledge of what happens interactionally in disagreement and how to support students’ moment-to-moment sensemaking in the disagreements that inevitably arise when engaging with contentious issues. I contend that when creating learning experiences built around such issues, we must be prepared to support students in navigating civic disagreement productively, as the models that youth have for civic disagreement in the beyond-school world tend to be ones of incivility. This study takes a step toward imagining science education that can prepare young people for the inevitable disagreement that comes in response to deciding what to do about science-related civic matters. Specifically, I analyze interactions within disagreement to document what discursive resources, *not* scientific, youth bring to disagreement about what to do about climate change, an issue with a long and deep history of politicized controversy in the USA.

**Conceptual framework**

**Discursive resources**

This study broadly uses a framing of discursive resources—or socio-linguistic resources (e.g., Gee and Green 1998) that students bring to bear within classroom discussion (e.g., Hsu 2013). To classroom activity, and often through discourse and language, students bring a variety of resources from multiple areas of their lives, including prior conceptual knowledge (Hammer 2000), cultural and linguistic repertoires (Gutiérrez, Baquedano-López and
Tejeda 1999), identities (Esmonde and Langer-Osuna 2013), and off-task ideas (Langer-Osuna, Gargroetzi, Munson and Chavez 2020), with much work demonstrating the creative and diverse ways in which youth deploy these resources to advance learning. With this lens, there are inevitably a multitude of resources that students draw on within classroom discussion, yet, in regard to discursively navigating disagreement, I am particularly interested in two sets of resources: relational practices and ideological positions, as they are likely to be particularly salient in the context of disagreement, for reasons explained below.

**Relational practices as discursive resources in disagreement**

Sociocultural approaches to learning theorize that thinking and knowledge are inherently social, with cognitive functions arising interactionally and knowledge produced socially (Vygotsky 1978). With a sociocultural perspective, individual actions are insufficient to explain human behavior; rather, all human praxis is realized through its embedding within collective activities directed toward a specific goal (Leont’ev 1978). Given this social nature of learning, knowledge, and human activity, relationships among individuals are paramount.

With such a theoretical perspective, it then becomes critical to consider social relations and their influence on learning. Specifically, this study attends to relational practices as a type of discursive resource. Embedded within classroom social activity, such practices work toward shifting relationships among students in dialogue, or relationships with others beyond the classroom, including hypothetical others.

Scholars have identified the importance of specific relational practices in science learning grounded in SSIs—contentious issues around which disagreement is likely to unfold. For example, perspective taking, or recognizing and considering “the diverse cognitive and emotional viewpoints of others” (Kahn and Zeidler 2016, p. 263), is thought of as necessary for engaging with issues that are inherently complex, ambiguous, and entail differential impacts for multiple groups of people. As a dynamic process that involves differentiating one’s position from those of others, perspective taking is inherently relational, with the potential to reduce the space between actors in conflict. Other work has shown that empathy, or the practice of understanding and sharing the emotions of others, is similarly important. For example, in prior work, colleagues and I found that civically engaged youth used empathic forms of reasoning, drawing on the emotions of others impacted by climate change to generate civic arguments (Zummo, Gargroetzi and Garcia 2021). Similarly, Benjamin Herman (2018) identified compassion as a construct important to students’ science learning when engaged with a particular controversial issue, describing compassion as the genuine care for people or nature (i.e., wild animals and/or natural landscapes) impacted by a certain position within an issue. Extending empathy and/or compassion is inherently relational, as it attempts to understand, care for, and/or take on the feelings of others. Through such relational work, actors change the space between themselves and others, reshaping it, remaking it, and potentially reducing an initially significant distance between themselves and others—distance that can often spur disagreement.

This study suggests that relational practices are likely important discursive resources engaged by students to navigate disagreement in science class. Without the sort of attention to the distance between sides given in relational work, a disagreement can become “disputative,” where the goal is winning at the expense of one’s opponent (Asterhan and Schwarz 2016)—a phenomenon potentially damaging to interpersonal relationships and perhaps inhibitive to science learning (Garcia-Mila, Gilabert, Erduran and Felton 2013).
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relational work, disagreement can spiral into the vitriolic, unproductive arguing that has so scarred the contemporary public sociopolitical sphere of the USA.

Ideology

The term ideology describes the shared systems of representation through which people act, speak, and participate in the social and material world (Althusser 1971). More than single words or ideas, ideologies reflect interconnected systems that mediate meaning making, specifically about the distribution of symbolic and material resources in society and about the power structures that influence those distributions. While one can use different ideologies to interpret the world, escaping ideology entirely is not possible. Rather, ideology is profoundly interwoven into the fabric of our social and material existence and into the interpretive capacities that allow us to navigate that existence.

Furthermore, ideology comes to have “material” existence through what people say and do; it is made possible through human action and speech (Hall 1985). Ideology therefore exists to the extent that it is inscribed in practices; social and cultural practices mediate the materialization of ideology and are, thus, inherently ideological, as it is through them that ideology comes to have materiality. Inscribed in practices, ideology exists in a reflexive space, both shaping what individuals say and do while at the same time being constituted and formed by those actions and speech.

To social spaces, such as classrooms, learners bring their own cultural practices (Roseberry, Ogonowski, DiSchino and Warren 2010) inscribed with various ideological interpretive lenses (Philip, Gupta, Elby and Turpen 2018). The ideologies that emerge then come to define the boundaries of what can be learned in that social experience. In a modern science classroom, where learning is designed to occur through discourse-based social and cultural practices (e.g., Kelly and Chen 1999), it is likely that ideologies made material through student discourse shape knowledge production that ensues (Zummo 2021).

Ideological positions

The stances that individuals take that make material an ideology within interaction, or ideological positions, likely influence learning. Examining ideological positions, Thomas Philip and colleagues (2018) used discourse analysis to depict how the stances taken by university-level engineering students over the course of a discussion about drone warfare made material ideologies of nationalism. The authors described these types of positions—stances about “civilians” and “terrorists” as inherently ideological, as they “contest or confirm social categories that are fundamentally connected to relationships of power” (p. 197). The ideological positions that students took on, even briefly, became resources for meaning making, acting as interpretive lenses and thereby influencing the course of the discussion and the meaning made by all students involved.

Ideological convergence, which happens around ideological positions, further holds implications for learning (Philip, Gupta, Elby and Turpen 2018). An interactional achievement produced through joint action of multiple participants, ideological convergence happens when individuals in discussion converge on an ideological stance. In convergence, speakers come to use the same interpretive lens—a lens shaped by ideology—as a resource for meaning making. Philip and colleagues showed that too early convergence limits learning, as it precludes expansive opportunities. In contrast, ideological divergence or
expansiveness holds potential for learning. Although it is often (and rightfully) cited as the root of many of today’s divisions, ideological divergence could be productive for learning. When made explicit, divergence of ideological positions can mediate consideration of many more possibilities than originally thinkable with only one’s own ideological stance in place.

Ideological positions are discursive resources that could be particularly relevant to students attempting to navigate disagreement. Divergent ideological positions, in particular, could occupy interesting, multi-faceted, and, at times, contradictory roles. Ideological divergence might be the root of the disagreement itself, yet making explicit that divergence could create expansive learning opportunities, particularly if students prior have not considered the other’s position. For these reasons, this study attends closely to ideological positions as discursive resources used by students in disagreement.

Research question

This study asks: what ideological and relational discursive resources do students bring to moments of disagreement during science learning?

Methods

Context and participants

This study took place in three sections of one 9th grade science class in a US city. All sections were taught by Mr. Thompson, an experienced science teacher. Mr. Thompson was recommended as a strong, discussion-oriented science teacher by leaders of a professional learning experience (PLE) in which he had participated. This science class served as the required science for all 9th graders.

Students came from a diversity of socio-economic, racial and ethnic, and language backgrounds. The school was a public high school serving a socio-economically diverse neighborhood. Approximately 45% of students received free or reduced-price lunch. The student population was approximately 50% white, 20% Latinx, 15% Asian, 8% multiracial, 5% Black or African American, and less than 1% Native Alaskan or American Indian. Roughly 25% were English Language Learners. Mr. Thompson’s classes represent the school’s overall demographic diversity. Across the three sections, there were 77 students in total, ranging in age from 13 to 15. Approximately 49% identified as girls, 48% as boys, and 3% as non-binary.

Data collection

This study examined student discourse within several whole class and small group discussions. All discussions occurred within a 2-week learning sequence, situated at the start of a curriculum unit on climate change. The climate change unit was the final unit of the academic year, occurring in April and May. Learning activities were designed using a three-dimensional approach (NRC 2012); students engaged in scientific practices, such as analyzing and interpreting data, to construct content knowledge about global climate change. This 2-week sequence was implemented as part of a larger research project aiming to understand
student learning of climate change science. However, this study deliberately focused only on discussions oriented around answering the civic question of What should we do? Data analyzed came from a few specific times within the 2 weeks. First, most data came from a small group activity implemented on the final 2 days of the 2 weeks. In this activity, students worked in groups of 2–5 and evaluated climate and energy choices for their city’s future and then decided on a course of action. This decision-making activity included two separate discussions per group, totaling approximately 50 min of dialogue per group. Audio data were collected and analyzed from two small groups from each class section. In total, data from 6 groups were analyzed for this study. The same 6 groups were recorded across the 2 days of this particular activity. Groups were selected randomly from a larger set of groups in which all student group members had consented to participate in research. Additionally, at times over the 2 weeks, Mr. Thompson held brief (less than 10 min), unplanned, open-ended whole class discussions in which he elicited students’ ideas about what to do about climate change. These discussions were audio-recorded and analyzed. Ethnographic field notes supported analysis and interpretation of data.

Data analysis

I listened to all audio recordings and reviewed ethnographic field notes, writing analytic memos to discern trends. I transcribed all data and used transcripts for discourse analysis (Gee 2014) involving several layers of qualitative coding schemes (Miles, Huberman and Saldaña 2020).

First, I identified moments of disagreement in each transcript. Defining a disagreement marker as a discursive move signaling a student’s misalignment with another’s view, position, or understanding, I compiled a set of disagreement markers observed in the dataset, including phrases such as “Yeah but,” “Well, but,” “though,” “actually,” and context-based contradictions to another student’s statement. I then reviewed the entire dataset to code for these markers. After coding, I created excerpts around the coded moments. Excerpts included dialogue that transpired following the disagreement marker, as well as any dialogue leading up to it needed to make sense of the disagreement. The starts and ends of excerpts coincided with the starts and ends of “phase units,” or analytic units used to demarcate classroom events (Brown and Spang 2008). In total, there were 24 excerpts evidencing disagreement. These excerpts came from 5 small groups from across the 3 sections. They also included moments of disagreement from 2 of the 3 whole class sections.

Using the 24 disagreement excerpts, I then developed a coding scheme that was emergent yet informed by the theoretical framework articulated earlier, approaching the data with the two lenses of relational practices and ideological positions. I developed a set of emergent codes within each category, in an iterative, inductive analytic process (Table 1). Additionally, I developed codes to capture disciplinary engagement in science, categorizing evident engagement as either distal or proximal (see Table 1). Once finalized, the codebook was applied to all 24 excerpts. Codes were applied at the level of talk turn only where applicable and only following the first disagreement marker of an excerpt. One talk turn could receive as many codes as applicable.

After coding, I re-examined the coded dataset to condense codes into themes, or pattern codes (Miles, Huberman and Saldaña 2020). This process shifted the analytic lens outward from the micro-talk-turn level to the macro-event or phase level, with the unit of analysis now at the level of the disagreement excerpt. In an iterative process, I hypothesized a potential pattern code applicable to two excerpts of disagreement, and then attempted to
| Category                | Code       | Definition                                                                                                                                 |
|-------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Disciplinary engagement | Distal     | Discourse-based evidence for a student’s disciplinary engagement in distal ways, such as using anecdotal or vague evidence, making up quantitative data, referring to a scientific concept without great depth, or offering hypothetical situations |
|                         | Proximal   | Discourse-based evidence for a student’s disciplinary engagement in proximal ways, such as using clear, well-sourced data or evidence linked to a claim, drawing on verified or confirmed data, or going into depth with explanation of a scientific concept |
| Relational practices    | Common activity | Orienting the other(s) in discussion to a common or shared activity or purpose                                                                              |
|                         | Common knowledge | Establishing common or shared knowledge among discussion participants                                                                                 |
|                         | Distancing  | Distancing of oneself from an "other"—either a group member or one outside the discussion                                                                                   |
|                         | Empathetic perspective taking | Explicitly considering the perspective and feelings of another person                                                                                                                                 |
|                         | Personalization | Personalizing an idea for either the speaker or another participant; explicitly making meaning of an idea in relation to oneself or another student in discussion |
|                         | Validating  | Validating another student’s contribution to discussion                                                                                                 |
| Ideological positions   | Capitalistic achievement as a goal | A position that glorifies or prioritizes the generation of wealth                                                                                       |
|                         | Collectivism as a goal          | A position that prioritizes well-being of a community as a whole                                                                                      |
|                         | Individualism as primary        | A position that prioritizes the needs and well-being of the individual over the collective                                                             |
|                         | Minority needs as unimportant   | A position that frames the needs and well-being of a small number of people as unimportant                                                            |
|                         | Rights to resources as inviolable | A position that prioritizes one’s (or a group’s) rights to resources (e.g., energy, land, transportation, etc.) as primary                                |
|                         | Government as regulator         | A position that locates responsibility and need to regulate with the government                                                                        |
|                         | Technocentrism as the solution  | A position that locates solutions to humanity’s problems within technology                                                                             |
apply it to a third to investigate whether the pattern held. Refining pattern codes and reapplying as necessary, I iteratively subsumed pattern codes into more general classes until the category was saturated, that is until new pattern codes did not add meaning to the larger cluster. To support reliability, I engaged in cross case analysis (Yin 2018), checking final cases for representativeness by looking for contrasting cases within the dataset. Additionally, I considered and tested alternative pattern codes, considering discrepant information within and across cases (Miles et al. 2020). Distribution of finalized patterns across participant groups can be seen in Table 2. (Table 2).

Findings

Students typically brought constellations of ideological and relational resources to disagreement (Table 1). In this section, I discuss four notable patterns, emergent in analysis (Table 2).

**Drawing on relational resources in disagreement related to ideological divergence**

One pattern that emerged was that of students navigating disagreement by drawing on relational practices in times of ideological divergence. Such disagreements tended to be rather extended, evidenced in long phase units or multiple connected phase units centered on the disagreement. Although not particularly common in the dataset (3 of 24 cases), I highlight this trend because of its significance. Disagreement related to ideological divergence reflects the sort of disagreement characteristic of US society at large. Ideological rifts sit at the forefront of contemporary, partisan politics and are often blamed for modern cultural chasms (e.g., Cohn 2021). That students were able to work through ideological divides through use of relational resources and, in many cases, to do so while maintaining a degree of disciplinary scientific engagement, was noteworthy.

One case comes from the small group composed of Arianna and Mason as they engaged in the decision-making activity. Disagreement was precipitated by their evaluating of a proposal to increase taxes to fund enhanced public transit. Transcript 1 documents the episode that then transpired.

The episode started with the two students discussing negative aspects of the proposal. Disagreement began at Line 1.11, marked by Arianna’s “Yeah but” in response to Mason’s statement that buses produce more CO\textsubscript{2} than cars. Not acknowledging Arianna, Mason continued to compare relative quantities of CO\textsubscript{2} emissions, reasoning quantitatively—albeit with vague and anecdotal evidence, reflective of distal disciplinary engagement (Lines 1.12–1.18). Arianna again signaled disagreement in Line 1.19 (“But like”). Mason again did not acknowledge Arianna’s signal, instead shifting to citing an example of a local bus line (Lines 1.21–1.24), again, drawing on anecdotal evidence. At Line 1.25, Arianna once again signaled disagreement and critiqued Mason’s argument by pointing out that the number of cars offset by a bus could be quite high.

This moment represents an important point in this interaction for several reasons. First, Arianna was able to air her disagreement with Mason after several attempts. And, she did so with an argument that used quantitative reasoning, an indicator of disciplinary engagement. Furthermore, engagement in relational practices became evident here. Mid-critique of Mason, Arianna did relational work of personalization by asking Mason if he takes the bus home (Line 1.27). When he said he does not, she responded “But do you see the bus
| Class section | Participant group          | Pattern code application                              |
|---------------|---------------------------|--------------------------------------------------------|
|               | Relational resources amid ideological divergence ($n=3$) | Precluding engagement ($n=10$) | Quick agreement ($n=8$) | Amid ideological convergence ($n=3$) |
| 1             | Arianna and Mason         | 1                                                      | –                        | –                        | 1                        |
|               | and                       | –                                                      | –                        | –                        | –                        |
|               | Whole class                | 2                                                      | 1                        | 2                        | –                        |
| 2             | Anders, Dev, and John     | –                                                      | 4                        | –                        | 2                        |
|               | Cody, Monica, and Sam     | –                                                      | 1                        | 1                        | –                        |
|               | Whole class                | –                                                      | –                        | –                        | –                        |
| 3             | Allen, Kylie, Ty, and Willa| –                                                      | 2                        | 1                        | –                        |
|               | Erin, Marci, and Spencer  | –                                                      | 1                        | 1                        | –                        |
|               | Whole class                | –                                                      | 1                        | 3                        | –                        |
steps though, right?” (Lines 1.31–1.32). Arianna related to Mason’s personal experience and then established common knowledge through a shared understanding of the number of students who take the bus (Lines 1.33–1.35: “they’re packed”). Mason took up Arianna’s attempts at relational work by agreeing with the common knowledge of “they’re packed.” Arianna went on to leverage that common understanding to critique Mason’s argument. She used quantitative reasoning to argue that the large number of students waiting for the bus—a shared understanding between Arianna and Mason—would equate to a number of cars orders of magnitude larger (Lines 1.36–1.41). The relational practices evidenced here appear to have at least somewhat supported progress of the disagreement, which notably also evidenced a degree of disciplinary engagement by Arianna and Mason.

In response, Mason conceded somewhat but also continued to signal disagreement with “Okay true but…” (Line 1.41, 1.43). The disagreement carried on along a similar path, with disputes centered over the relative quantities of people transported and CO₂ emitted. The two students continued to engage disciplinarily in distal ways to consider this issue of relative carbon impact and different modes of transportation. Then, the disagreement took another notable turn.

Transcript 1

| Line | Speaker   | Text                                                                 | Code          |
|------|-----------|----------------------------------------------------------------------|---------------|
| 1.01 | Arianna   | Cons                                                                |               |
| 1.02 | Mason     | Literally okay                                                      |               |
| 1.03 | Arianna   | Not everyone can afford it                                          |               |
| 1.04 | Mason     | Literally what if you don’t have FRIENDS                            |               |
| 1.05 |           | I know that sounds like a really bad thing                          |               |
| 1.06 |           | But like if you don’t have friends                                  |               |
| 1.07 |           | And                                                                 |               |
| 1.08 |           | They’re literally saying we should spend more money to do           |               |
|      |           | buses and trains                                                    |               |
| 1.09 |           | Buses they pro–                                                    |               |
| 1.10 |           | They produce way more CO₂                                        |               |
| 1.11 | Arianna   | Yeah but                                                           | Disagreement  |
| 1.12 | Mason     | Like city buses school buses                                       | Disciplinary (distal) |
| 1.13 |           | They produce way more CO₂                                        |               |
| 1.14 |           | A day                                                              |               |
| 1.15 |           | Than                                                                |               |
| 1.16 |           | You would driving                                                  |               |
| 1.17 |           | ‘Cuz they’re                                                        |               |
| 1.18 |           | They’re going back and forth                                       |               |
| 1.19 | Arianna   | But like–                                                           | Disagreement  |
| 1.20 |           | Okay                                                                |               |
| 1.21 | Mason     | The old six used to go                                             | Disciplinary (distal) |
| 1.22 |           | Like from Hampden to Johnston                                      |               |
| 1.23 |           | That was a four and five hour round trip without stopping          |               |
| 1.24 |           | That was like–                                                     |               |
| 1.25 | Arianna   | But think about how many people are on that                        | Disagreement  |
|      |           |                                                                     | Disciplinary (distal) |
|      |           |                                                                     | Rel: Personalization |
| Line | Speaker | Text                                                   | Code                                      |
|------|---------|--------------------------------------------------------|-------------------------------------------|
| 1.26 | Mason   | Think about how many kids are crammed onto the–        |                                            |
| 1.27 | Mason   | Do you take the–                                      |                                            |
| 1.28 | Mason   | Do you bus home?                                      |                                            |
| 1.29 | Mason   | No                                                     |                                            |
| 1.30 | Mason   | I live two blocks away!                                |                                            |
| 1.31 | Arianna | But do you see the bus stops though                    | *Rel: Common knowledge*                   |
|       |         |                                                        | *Rel: Personalization*                    |
| 1.32 | Mason   | Right?                                                 |                                            |
| 1.33 | Mason   | Yeah                                                   |                                            |
| 1.34 | Arianna | They’re packed                                         | *Rel: Common knowledge*                   |
| 1.35 | Mason   | They’re packed                                         | *Rel: Common knowledge*                   |
| 1.36 | Arianna | And then think about                                   | *Rel: Common knowledge*                   |
|       |         |                                                        | *Rel: Personalization*                    |
|       |         |                                                        | Disciplinary (distal)                     |
| 1.37 |         | Each kid                                               |                                            |
| 1.38 |         | Being picked up                                        |                                            |
| 1.39 |         | And how many cars THAT is                              |                                            |
| 1.40 |         | Driving                                                |                                            |
| 1.41 | Mason   | Okay true but like                                     | *Disagreement*                            |
| 1.42 | Arianna | back and forth                                         |                                            |
| 1.43 | Mason   | Okay true but like                                     | *Disagreement*                            |
|       |         |                                                        | Disciplinary (distal)                     |
| 1.44 |         | Some                                                   |                                            |
| 1.45 |         | Most bus routes                                        |                                            |
| 1.46 |         | They don’t have a bunch of people                      |                                            |
| 1.47 |         | There’s like mini buses                                 |                                            |
| 1.48 |         | Like 30-footers                                        |                                            |
| 1.49 | Arianna | But they take at least like a thousand people           | *Disagreement*                            |
|       |         |                                                        | Disciplinary (distal)                     |
| 1.50 |         | Like the whole–                                        |                                            |
| 1.51 |         | A bus line                                             | *Disagreement*                            |
| 1.52 | Mason   | But                                                    |                                            |
| 1.53 | Arianna | People transfer                                        | *Disagreement*                            |

In Line 1.56, Arianna brought a new resource to the disagreement—the notion that people need public transportation, such as city buses. In this moment, Arianna surfaced an ideological position previously implicit: “people still need transportation” (Line 1.57). At its core, this position is ideological, as it is a view about the distribution of goods in society and who has access to them. Transportation, particularly public transportation funded by governmental resources, such as city buses, are a form of societal goods. In this moment, Arianna made material a position that people need such public goods, particularly the public good at stake here of city buses. This move represents a turn in the disagreement as it made material an ideological position that was previously tacit.

At first, Mason did not respond to Arianna’s explicitly ideological critique of his argument, and he again attempted to advance his argument using quantitative reasoning. In response, Arianna again made material ideology in critique of Mason’s stance by saying “people need that though, you’re just not one of them” (Lines 1.72–73). Importantly, here,
layered onto her ideological position, Arianna also engaged in relational practices. In addition to making material ideological positions related to the public good of affordable transportation, she identified where Mason exists in relation to the people who need the good that is at stake—Mason is “just not one of them.” Attending to the space between Mason and hypothetical others, Arianna engaged in relational work. She identified why Mason has a hard time with her critique, saying “So you don’t you’re not gonna understand” (Line 1.74).

In response, Mason both signaled continued disagreement (“Yeah but”; Line 1.75) while also conceding somewhat (“Okay true”; Line 1.76). He then retreated to the previous line of debate about relative amounts of CO₂ released. He drew a conclusion that the bus routes with low ridership are “Just giving out CO₂ for like literally no one” (Line 1.82). With this statement, divergence from Arianna’s ideological position is evident. While the ridership of the line in question might be low, Mason reduced that ridership to “literally no one”; this position conflicts with Arianna’s that people need transportation, and, extrapolated that they have rights to public transit. Mason appeared to remain attached to his claim, implicitly drawing on ideology that negative impacts are tolerable if they happen only to a few people. In parallel, Arianna appeared to remain attached to her claim and did not engage with Mason’s ideological position.

At the end of this phase unit, the disagreement seemed to be at an impasse. Mason turned from Arianna to talk briefly with Mr. Michaels, the student teacher, who was walking by the pair. To Mr. Michaels, Mason asserted his point that some city buses do not have many riders. Mr. Michaels agreed that was an interesting point. After Mr. Michaels walked away, Arianna was typing and looking at her paper. Mason continued talking, seemingly to himself yet out loud. He said: “I know, I’m not one of those people, so I wouldn’t…I would get it if you’re that person who needs this ONE.” In this moment, Mason appeared to be considering Arianna’s ideological position, divergent from his own, and perhaps trying to resolve that with his own argument about relative amounts of greenhouse gas emissions.

Transcript 1, continued

| Line | Speaker | Text                                                                 | Code               |
|------|---------|----------------------------------------------------------------------|--------------------|
| 1.54 | Mason   | But like the bus that goes out to Edgeton                           | Disagreement       |
|      |         |                                                                     | Disciplinary (distal) |
| 1.55 |         | The bus that goes out to Edgeton probably doesn’t have much a       | Disagreement       |
|      |         | lot of people on it                                                 | Id: Rights to resources |
| 1.56 | Arianna | Yeah but people still need it                                        |                    |
| 1.57 |         | Ultimately it comes down to people still need transportation and     | Disagreement       |
|      |         | don’t have it                                                       | Id: Minority needs  |
| 1.58 | Mason   | Yeah                                                                |                    |
| 1.59 |         | But                                                                  |                    |
| 1.60 |         | They should probably get rid of a couple of lines that literally     |                    |
|      |         | has like                                                            |                    |
| 1.61 |         | Low riders                                                          |                    |
| 1.62 |         | Low rider things                                                    |                    |
| 1.63 |         | Low rider                                                           |                    |
| 1.64 |         | Whatever                                                            |                    |
| 1.65 | Arianna | Uh                                                                  |                    |
Although the disagreement surfaced in this case did not come to clear resolution, it did progress and afforded some opportunity for students to examine their contrasting positions and consider new ideas. As it unfolded, the disagreement was also characterized by frequent drawing on relational practices by students. Arianna established common knowledge and engaged in personalization with Mason. Just as important, Mason took up Arianna’s bid to establish common knowledge (Line 1.35) and acknowledged the validity of her points at multiple times (“Okay true but…”; Lines 1.41, 1.43). This relational work, accomplished jointly by Arianna and Mason, appeared to allow for the disagreement to progress, as they established shared understandings and tried to get each other to reconsider their respective positions, even amid ideological divergence evidenced in their conflicting view of the public good of buses.

**Disagreement precluding engagement**

Many cases of disagreement (10 of 24) appeared to preclude or shut down engagement, including disciplinary engagement. Such cases typically took the form of students ignoring each other or dismissing points of disagreement, without outright incivility. To these moments of disagreement, students often brought diverse sets of ideological and relational resources; however, those resources were not typically taken up or responded to positively by fellow students.

A common pattern was as follows: one student would voice a disagreement, the disagreement would be dismissed, and those who did the dismissing would then change the
topic. An example can be seen with a group of three students working together in the decision-making activity. As they considered a proposal to limit low occupancy vehicle travel, Cody brought up concerns (Transcript 2).

Transcript 2

| Line | Speaker | Text                                                                 | Code       |
|------|---------|----------------------------------------------------------------------|------------|
| 2.01 | Cody    | Wait so you couldn’t even drive alone if you’re single               |            |
| 2.02 | Cody    | Like if you’re literally living in a house by yourself?             |            |
| 2.03 | Monica  | Yeah                                                                 |            |
| 2.04 | Cody    | That’s stupid                                                         |            |
| 2.05 | Monica  | What if you don’t want to pay for Uber?                              |            |
| 2.06 | Sam     | I actually think this would be great                                 | Disagreement |
| 2.07 | Sam     | I think this one is better than the last one                         |            |
| 2.08 | Monica  | Yeah                                                                 |            |
| 2.09 | Cody    | Yeah but like                                                        | Disagreement |
| 2.10 | Cody    | How do you think a SINGLE person feels?                             | Rel: Empathetic |
| 2.11 | Monica  | Have friends                                                         |            |
| 2.12 | Monica  | So if you and your co-worker live in the same neighborhood          |            |
| 2.13 | Cody    | What if you’re super lonely                                         | Rel: Empathetic |
| 2.14 | Cody    | And you’re like an idiot                                            |            |
| 2.15 | Cody    | And you just drive to work                                           |            |
| 2.16 | Monica  | There’s not a lot of people like that, Cody                         | Disagreement |
| 2.17 | Monica  | That don’t have co-workers                                          |            |

At the start of the phase unit, Cody indicated that he does not like this proposal (“That’s stupid,” Line 2.04). Monica disagreed with him (Line 2.06), and then Cody indicated disagreement in response (Line 2.09). To justify his disagreement Cody, then engaged in a relational practice of attempting to generate empathy among his groupmates for a hypothetical “SINGLE person” (Line 2.10), and furthered this practice in Lines 2.13–2.15. Yet, instead of generating empathy among Monica or Sam, Cody’s move is met with resistance, as Monica dismissed it with “There’s not a lot of people like that, Cody” (Line 2.16). Here, the topic of conversation changed and Cody’s disagreement was left largely ignored, as his groupmates did not take up his relational work of generating empathy for a hypothetical other.

In another example in which a point of disagreement was dismissed (rather than ignored), students were sharing their questions and concerns about climate change in a spontaneous whole class discussion coordinated by Mr. Thompson (Transcript 3). In Lines 3.01–3.03, Sam shared her concern that the “window of stopping a climate catastrophe” is shrinking. In response, John dismissed Sam’s concern (Line 3.04). With this marker of disagreement, he also aired an ideological position that made material individualism. By saying “our kids will deal with it,” John made material an individualist ideological stance that prioritizes the self (i.e., John) over the collective, future good. This ideological stance was further made material in Line 3.08, when John declared that he is “not giving up loud cars” in response to Monica’s posing of a question about lifestyle change (Line 3.09). With this ideological position, John dismissed the point of disagreement between Sam and himself.
Transcript 3

| Line | Speaker | Text                                                                 | Code              |
|------|---------|----------------------------------------------------------------------|-------------------|
| 3.01 | Sam     | It’s like in 12 years                                               |                   |
| 3.02 |         | Because it’s going up so drastically each year that                 |                   |
| 3.03 |         | Our time window of stopping a climate catastrophe is getting smaller and smaller |                   |
| 3.04 | John    | Ah, our kids will deal with it                                       | Disagreement      |
|       |         |                                                                     | Id: Individualism |
| 3.05 |         | [Crosstalk]                                                         |                   |
| 3.06 | Monica  | And then umm also—                                                  |                   |
| 3.07 |         | In which ways can we change our lifestyle?                          | Disagreement      |
|       | John    | I’m not giving up loud cars                                          | Id: Individualism |
| 3.09 |         | Sorry                                                               |                   |
| 3.10 | Monica  | Also what laws are being passed?                                    | Id: Government    |
| 3.11 |         | And what is government doing to help?                                |                   |

The examples shown here are typical of cases of disagreement precluding engagement identified in this dataset. No cases in the dataset show students disagreeing with each other in uncivil or overt ways. Rather, when disagreement was unproductive—in that it did not mediate further engagement or disciplinary engagement—it involved students dismissing the opposing view and moving on, ignoring each other, and/or avoiding the point of disagreement.

**Disagreement followed by quick agreement**

In many cases (8 of 24), a point of disagreement was aired, responded to, and then followed by quick agreement, at least superficially. For example, see Transcript 4. A small group was considering the pros and cons of a suggestion to fund scientific research on renewable energy. Starting this episode, Spencer offered a con (Line 4.01).

Transcript 4

| Line | Speaker | Text                                                                 | Code              |
|------|---------|----------------------------------------------------------------------|-------------------|
| 4.01 | Spencer | It’s also not guaranteed to produce results                         |                   |
| 4.02 |         | Actually I’ve heard of a BETTER system                              |                   |
| 4.03 |         | Where rather than just giving scientists money up front             |                   |
| 4.04 |         | You pay them to produce results                                     |                   |
| 4.05 |         | You pay them AFTER they create a result                             |                   |
| 4.06 | Erin    | Yeah, but                                                           | Disagreement      |
| 4.07 |         | They need money to CREATE the result                                |                   |
| 4.08 |         | Usually                                                             |                   |
| 4.09 | Spencer | Yeah but also if—                                                  | Disagreement      |
| 4.10 | Marci   | You pay them once—                                                 | Id: Capitalism    |
Spencer suggested that the proposed measure is not guaranteed to produce results and instead offered an idea about paying scientists after they produce results (Lines 4.02–4.05). Erin appeared to disagree with this idea (Lines 4.06–4.08). Marci sided with Spencer, and then Erin revoiced her argument against Spencer’s proposal (Lines 4.13–4.15). Spencer then drew on an ideological position related to capitalism, arguing that if funded scientists do not produce results, “that’s just money down the drain” (Lines 4.16–4.19). This position appears to spur Erin’s agreement, with “Yeah” (Line 4.20), and Spencer follows with “There’s never a one size fits all solution” (Line 4.22).

Disagreement amid ideological convergence

In a few cases (3 of 24), students approached disagreement amid ideological convergence, or shared ideological terrain where certain assumptions went unquestioned. In these cases, shared ideological positions, sometimes in conjunction with relational practices, often appeared to serve as means of moving past a disagreement. One example comes from a group of three—John, Anders, and Dev—during the decision-making activity. Prior to the episode described here, the group had experienced several disagreements that stalled and did not progress. Around these disagreements, the three boys were not particularly engaged, and there was very little discussion. However, this changed when their conversation turned toward innovations that could reduce the carbon impact of cars. The group engaged in a somewhat extended disagreement over whether solar power could fuel a car. This disagreement shifted into offering design ideas about a potential car powered by wind turbines embedded within the vehicle (Transcript 5; Line 5.01).

Throughout this discussion, John engaged in relational practices by establishing a common activity among the three students, often using plural pronouns, for example, in Lines 5.05 through 5.08 with “we’re gonna…all three of us are gonna build a car.” This work was typically taken up by Dev, for example, with “we’re the next Steve Jobs, boys” (Line 5.09). Dev’s uptake of John’s relational work was important to the joint accomplishment of progressing through the disagreement.
With the “Steve Jobs” comment (Line 5.09), Dev also brought a new resource to the discussion—an ideological position of capitalistic achievement as something to aspire to. With this move, Dev both made material an ideological position about capitalism and furthered the relational work of the group, reconfirming their common activity. Dev’s ideological position was not contested. Instead, John took it up and built on it by saying “we are the next Dubai princes, because we’re gonna have so much g–d–money” (Lines 5.10–5.11). These two lines fit within the same ideological space of capitalism, representing the same position that extreme wealth is something to aspire to—evidence for potential ideological convergence among Dev and John.

At the same time, it is also important to point out that Anders largely stayed out of the discussion. Following John and Dev’s continued relational work and disciplinary engagement, Anders commented “that’d be stupid” (Line 2.53), again signaling disagreement. Despite this negative comment, in the episodes following this excerpt, John and Dev continued their enthusiastic conversation about where wind generators could be placed on a car to ensure power production without adding resistance. At this idea, Anders got back involved by suggesting adding solar panels to cars—similar to an idea that John had raised earlier. The others built on Anders’ contribution and continued their design work, as they pieced together ideas. Throughout this discussion, John persisted with frequent relational work, often built around establishing common activities and goals. For example, at one point he declared “bro, we’re gonna be f-ing geniuses,”
enlisting the others in shared future success. The discussion continued for several minutes in this manner.

**Discussion**

**The role of relational practices in disagreement**

This analysis demonstrates the importance of relational practices for navigating disagreement. Specifically, it shows the role of relational work in disagreements that progress productively—that is, those that allow for the exploration of multiple ideas and that do not degrade into incivility. For example, in Mason and Arianna’s bus debate, joint relational work was evidenced throughout. Typically in the public sphere ideological rifts—as that between Arianna and Mason about the public good of a city bus—lay the groundwork for disputative or unproductive disagreement. Yet, through the relational work of these two students, their disagreement progressed in a way that was not only civil but also allowed them to explore ideas using disciplinary approaches, albeit often in distal forms. I argue that this extended disagreement and related disciplinary engagement was afforded by the relational work the two did, such as their engagement in personalization and establishing common knowledge.

Conversely, two observed patterns in this dataset: disagreement precluding engagement and disagreement leading to quick agreement (Patterns 2 and 3; Table 2), reflect what could be called unproductive disagreement. Disagreements in these cases did not progress—they did not become means for students to explore new ideas, consider alternatives, or engage disciplinarily to generate new thinking. Importantly, across cases showing these patterns, there were few coded instances of relational practices. Where they were, for instance, in Transcript 2 with Cody’s attempt to generate empathy for a hypothetical other, relational work was not taken up by others, and it faltered. The disagreements in such cases did not progress, and they did not become generative to or supportive of disciplinary engagement.

While perhaps critical to navigating disagreement across ideological distance, as seen with Arianna and Mason, relational practices also seemed important in cases of disagreement amid ideological convergence. For example, in the group of Anders, Dev, and John, John’s persistent relational work—which mainly revolved around establishing a shared enterprise—seemed to push further the work that students were doing around brainstorming the design of an innovative car. In contrast, in a case of disagreement amid ideological convergence without relational work, quick agreement is perhaps likely, similar to that seen in Transcript 4 with Erin, Marcie, and Spencer. Such quick agreement affords little opportunity for expansive thinking or to explore new ideas, particularly via disciplinary engagement.

This analysis also demonstrates that relational work is joint activity—it cannot be done successfully by an individual alone. When Arianna engaged in the relational practice of personalizing, Mason did what Arianna asked and drew on his personal experience. When John attempted to establish a shared enterprise by using “we,” Dev took up that enthusiasm and continued speaking in the first-person plural. In contrast, cases of unproductive disagreement often reveal attempts at relational work left unattended to or denigrated. For example, when Cody tried to generate empathy among his groupmates, they denied this attempt, saying that the type of person for whom Cody felt empathy does not exist. While
relational work is important to productive disagreement, it is just as critical that such relational work be taken up by others.

In many ways, findings about relational practices speak to prior research. Science education scholars of socio-scientific issues (SSIs) have identified a particular relational practice—perspective taking—as critical to SSI-based science learning, as it allows for learners to understand the complexity and often ambiguous implications of decisions within SSIs (Kahn and Zeidler 2016). Similarly, past work has shown that extending empathy (Herman, Zeidler and Newton 2020) and compassion (Herman 2018) are important to science learning grounded in SSIs, allowing for more nuanced understandings of multi-faceted issues (Zummo, Gargroetzi and Garcia 2021). The present study speaks to these notions while also furthering the concept of relational practices as discursive resources. The analysis offered here shows a multitude of relational practices, including perspective taking, empathy, and several others, that youth bring as discursive resources to disagreement (see Table 1). Findings both offer support for SSI scholars advocating for the primacy of perspective taking (e.g., Zeidler, Herman and Sadler 2019) but also suggest a broader category of relational practices at work. And, as with all social and cultural practices, these are fluid, responsive to the actor and context and purpose. While they manifested in certain ways within this study, they will likely take on different character in other contexts with other learners.

This finding also reflects findings from scientific argumentation scholars. Prior research on classroom-based argumentation has identified a similar need for relational practices, although without using the term; Asterhan and Schwarz (2016, p. 167) argued that within productive argumentation, participants must have a willingness to listen, to critically examine ideas different from one’s own, and to support “an atmosphere characterized by collaboration and mutual respect.” Building on this research, I suggest that these characteristics all constitute aspects of relational work, which are also critical beyond the practice of argumentation, in cases of more spontaneous disagreement. Disagreement does not occur only in argumentation but is itself endemic to social life in 2022 and, by default, present in K-12 science classrooms, regardless of scientific practice centered at a given moment of instruction.

**Ideological positions as discursive resources**

This analysis shows that ideological positions can be used by youth as discursive resources to navigate some disagreements. At times within disagreements, students evidenced divergence in their ideological positions. In a small number of cases, this sort of division laid the groundwork for productive disagreement. For example, in the bus debate, Arianna’s making explicit of her stance on people’s need of public transit led to her and Mason’s examining alternative angles and considering the implications of their respective sides—a moment of the ideological expansion that could be quite useful to learning (Philip, Gupta, Elby and Turpen 2018). Yet, given that ideological divergence can bring to light significant divisions, productively navigating such disagreement demands strong relational work, also as seen in the case of Arianna and Mason.

At other times, students drew on convergent ideological positions as discursive resources. Often, this happened after the instant of disagreement itself but before the episode ended. For example, following their initial disagreement, Anders, Dev, and John appeared to converge around the ideological stance of capitalistic profit generation as something to which to aspire. This convergent position seemed to motivate their disciplinary
engagement toward designing a low emissions vehicle and temporarily move past the disagree-
ment. Yet, it is also worth considering what that conversation could have been had the
three students not converged so readily on this ideological position. For instance, if one
student had made explicit an ideological position contesting humans’ rights to use natural
resources, perhaps that could have shifted the direction of the group’s disciplinary work.

Limitations

This study comes with limitations. Done in three sections of just one classroom, led by one
highly experienced teacher committed to student-centered discussion, this study is difficult
to generalize to other classrooms. What transpired around disagreement in Mr. Thomp-
son’s classroom might not be typical for 9th grade classrooms nationally or internationally.
Furthermore, this study examined disagreement only in the context of climate change as a
civic matter. It is quite possible that disagreement and the learning opportunities surround-
ing it could unfold quite differently around other civic issues. Future work should study
other contexts, a broader range of classrooms, and other civic issues that spur disagre-
ement—for example, COVID-19 restrictions or regulation on genetic engineering. Other
empirical methods, too, could complement this fine-grained discourse analysis of brief
moments. Despite these limitations, this exploratory study of discursive resources used by
youth shows the possibility for learning via disagreement and begins to suggest what fos-
tering productive disagreement in the science classroom might involve.

Additionally, within the current post-truth era (e.g., Lewandowsky, Cook and Ecker
2017), it is important to clarify that the vision of productive disagreement put forth by this
study assumes the epistemic integrity of science. Explicit acknowledgement of this com-
mitment is necessary in a time of rising alternative epistemologies in which scientific prac-
tices and knowledge bear little weight (e.g., Hornsey 2020). With this work, I emphasize
that it is critical that disagreement unfolds not over the merit of scientific epistemology
itself but rather over how we prioritize the divergent, multiple, complex factors embed-
ded within contentious science-related issues when figuring out “what to do.” While sci-
ence is not superior to the multiple culturally rooted epistemologies youth bring to science
class (Bang and Medin 2010), I adopt the perspective that the “pretty good knowledge”
produced through science is a helpful way of orienting to the problems that need solving
(Feinstein and Waddington 2020). The notion of productive disagreement in and for sci-
ence learning used in this study presupposes this view; while what to do is up for debate,
the epistemic integrity of science is not.

Conclusion

In answering civic questions involving science, disagreement is inevitable. If we want
young people to use science knowledge and practices in their civic lives beyond the class-
room—and, critically, if we want them to persist in using that science once they encounter
disagreement—we must prepare them to do so. Therefore, along with fostering students’
disciplinary science practices such as explanation and argumentation, we should be seeking
ways to develop their science-civic practices, or ways of participating and making meaning
in the world that interweave science practices with other practices, such as relational work.
By examining moments of disagreement among adolescent science students, this study calls for the field’s reflection on what practices and knowledges youth might need for navigating science-civic matters within the contested sociopolitical terrain of the twenty-first century. Echoing calls for an emphasis on preparation for science-related civic engagement (Levy, Oliveira and Harris 2021), this study makes the case specifically for leveraging civic disagreement as a potential learning opportunity. Building on prior work on classroom learning and contentious issues (e.g., Walsh and Tsurusaki 2014), I argue that greater attention to civic disagreement in the classroom could help prepare youth to navigate the divisive sociopolitical terrain of the twenty-first century in ways that adults have not. Echoing others (McAvoy and Hess 2013), this study calls on educators to embrace disagreement—something that is inherently difficult but critically important, as it could mirror the challenges that youth will face as they try to figure out what to do in a volatile civic world. At the same time, this study also serves as a reminder of the criticality of relational work and our duty to support youth with such practices.

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