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Solving for X: Constructing Algebra and Algebra Policy During a Time of Change

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Abstract

The year students take Algebra I historically determines how far they progress in secondary mathematics, creating complex equity issues around access to this course. By examining a case study of one large, urban school district adjusting to the Common Core State Standards in Mathematics (CCSS-M), we demonstrate how district leaders' interactions, in combination with their organizational and institutional environments, led to an overhaul of the secondary mathematics course pathway, ending in detracked middle school mathematics. We find that district leaders' deliberations of mathematics policy were constrained by organizational concerns around pedagogy, equity, logistics, and politics. In other words, the disruption created by the CCSS-M was limited by extant organizational priorities. This study has potential implications for theorizing disruptions and for better understanding equity-oriented mathematics policy and practice.

Keywords

tracking, school policy, ethnography, educational policymakers, STEM

The year students take Algebra I often determines how far they can progress in mathematics before college, and white and affluent students often take the course earlier than low-income students and black and Latinx students (Domina et al. 2016; Stein et al. 2011). Previous research documents this inequity (e.g., Domina et al. 2016) and considers the way schools implement district policy and sort students inequitably into classes (e.g., Lewis and Diamond 2015), but there is less research exploring how these mathematics policies are decided in the first place. Given that algebra occupies such a significant role in terms of equity, this is an important gap to fill. We build this understanding by examining how one California school district, which we call Cypress,[1] redesigned mathematics in response to the state adoption of Common Core State Standards in Mathematics (CCSS-M).

California's switch to CCSS-M in 2014, which required school districts to implement the new standards (Steele et al. 2016), was a monumental shift in content and pedagogy. Many viewed the new policy as a potential end to the ''math wars,'' that is, the debates over mathematics that have occurred in waves throughout the past century (Schoenfeld 2004). Previous literature might predict that, facing the disruption of CCSS-M, district leaders would make politically savvy policy decisions to please historically powerful stakeholders (Turner and Spain 2020) even if this maintained extant inequalities in mathematics (Lewis and Diamond 2015; Lucas 2001) or made only superficial changes to the mathematics infrastructure (Meyer and Rowan 1977). However,

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Cypress's decision ran counter to these predictions. District leaders prioritized equity and pedagogy over maintaining the politically convenient status quo, and they made the controversial choice to detrack middle school mathematics. By looking at how Cypress made this unexpected move, we shed light on the processes of district policymaking in service of equity goals.

To investigate this puzzle, we used a novel combination of inhabited institutionalism and frame analysis to analyze over 350 hours of observations of district leaders' decision-making (Benford and Snow 2000; Hallett and Hawbaker 2020).[2] We asked: How did district leaders contend with and interpret the CCSS-M, especially in terms of algebra? How did district leaders frame their concerns around their policy decision? How did these frames and counterframes ultimately result in the final decision to detrack middle school mathematics? We find that district leaders adopted the CCSS-M's new way of thinking about mathematics and then grappled with extant organizational concerns around pedagogy, equity, logistics, and politics in devising a policy solution. The combined priorities of equity, logistics, and pedagogy outweighed the need for political expediency, leading the district to remake their course structure by detracking middle school mathematics. The leaders accomplished something rare in education: a policy that redistributed opportunity to prioritize equity goals.[3]

We make several contributions to extant literature. First, our novel combination of inhabited institutionalism with frame theory is a theoretical contribution in and of itself. Inhabited institutionalism explains that institutions, organizations, and interactions are interlocking aspects of the institutional field that are tightly or loosely coupled, and we use frame theory to account for the *mechanisms* that lead to tight or loose coupling. This framework allows us to understand the relationship between external disruptions and organizational change by demonstrating that the effects of disruptions can be constrained by stable elements of the organization. We also contribute to the empirical understanding of how social constructions of school subjects—in relation to equity, pedagogy, politics, and logistics concerns—factor into district decision-making around mathematics.

THE CONTESTED NATURE OF ALGEBRA

School subjects are not static social facts. They are social constructions that have the potential to change over time in response to social conflict or change (Apple 2004; Gumport and Snydman 2002). School subjects are constructed through a combination of political, cultural, and ideological conflicts, focusing on connections between secondary curricular content and changes in academic knowledge (Goodson 1983; Gumport and Snydman 2002), contests that take place when outside groups challenge the curricular status quo (Binder 2002), or the way that prioritized skills and knowledge connect to larger social inequalities (Apple 2004). Scholars have also analyzed how teachers negotiate the content they teach through collective sensemaking around interpreting curricula, policies, and regulations (Coburn 2004; Russell 2011).

Mathematics has unique qualities as a school subject that make it susceptible to equity issues yet particularly resistant to change. Alongside literacy, mathematics receives the most attention in conversations about teaching and organizing for instruction in schools (Burch and Spillane 2003). A set of gendered and racialized stereotypes depict who is ''good'' at mathematics: Boys and white students are seen as good at mathematics, and girls and students of color are expected to struggle (Guiterrez 2012; Martin 2009). These stereotypes, alongside early tracking in mathematics, lay the groundwork for equity issues (Stodolsky 1988). It is particularly difficult to correct bias in mathematics because it is seen as the most ''objective'' subject area and people equate mathematical ability with intelligence (Martin 2009).

Mathematics stands out in one additional way: The content and sequencing of courses is particularly important (Finkelstein et al. 2012). Compared to other subjects, mathematics learning tends to be developmental and cumulative: Students master concepts and skills to successfully progress to the next level of complexity, and the sequence is typically more routinized and structured than other subjects (Stodolsky 1988). Consequently, the order and timing of mathematics courses—or *course pathway*—matters because it structures students' transitions between courses

and progress toward more complex mathematical content, with significant repercussions for graduation and postsecondary success (Adelman 1999). A typical secondary mathematics course pathway moves through Algebra I, geometry, Algebra II, precalculus, and calculus (Fong et al. 2016).

Algebra I is seen as a cornerstone of mathematics, but it has been conceptualized in different ways throughout U.S. history. Since the nineteenth century, stakeholders have debated several issues related to the teaching of algebra in K–12 schools: Should it be required? If so, at what level? Should it be designed as a discrete course or a sequence of ideas? (Karp 2014; Klein 2003). In the early twentieth century, schools suspended mathematics requirements because algebra was seen as inappropriate for the ''great army of incapables'' entering public schools (G. Stanley Hall, as cited in Karp 2014:329). This began algebra's centuries-long legacy as a stratifying subject because these ''incapables'' were immigrants, working-class, and nonwhite people (Karp 2014). In the 1950s, schools began requiring more mathematics, but it was not until the National Council of Teachers of Mathematics (1980) published its *Agenda for Action* in 1980 that algebra was expected to be part of every student's high school curriculum. Since the 1990s, students have taken algebra earlier and earlier to move farther in mathematics before college through advanced placement (AP) courses. One recent policy solution adopted in many districts, ''Algebra-for-All,'' required all students to take Algebra I by eighth grade, with the goal of enabling all students access to advanced mathematics in high school. Starting Algebra I in eighth grade has shown mixed results (Clotfelter, Ladd, and Vidgor 2012, 2015; Domina and Saldana 2012; Moses and Cobb 2002; Stein et al. 2011).

At the time of our study, the CCSS-M was the most recent turning point in mathematics education and Algebra I. The CCSS-M was developed by state leaders involved in the National Governors Association Center for Best Practices and the Council of Chief State School Officers. The goal was to create common standards for high-quality education for students across the country, and its implementation was a major undertaking for districts (Kober and Rentner 2011; Leibtag 2013). The CCSS-M represented a new way of structuring algebra, with algebraic ideas developed across grades K through 12. As states adopted CCSS-M, educators confronted issues around professional development, instructional materials, and how to structure and sequence new mathematics courses (Durland et al. 2016; Huguet et al. 2021).

Historically, algebra policy has had significant consequences for equitable outcomes for students, determining how far they go along the mathematics course pathway. Scholars argue that mathematics tracking—specifically the timing when students take Algebra I—reinforces structural inequalities and has an outsized effect on academic careers (Domina et al. 2015, 2016; Domina and Saldana 2012; Long, Conger, and Iatarola 2012; Stein et al. 2011). Algebra I serves as gatekeeper, determining how far students go in mathematics in high school. Access to Algebra I has enormous racial and socioeconomic status-based discrepancies, however, with white and affluent students usually occupying higher-level tracks and reaping the benefits (Domina and Saldana 2012; Riegle-Crumb and Grodsky 2010). Research also shows *detracking* usually has either a neutral or positive effect on all students (Ballard 2018; Burris and Garity 2008), although individuals can still manipulate the system to maintain their advantage when the rules are not clear (Lucas 2001).

School District Instructional Decision-Making

The decision to allow individual students to accelerate often falls to individual teachers or guidance counselors (Lewis and Diamond 2015), but the broader policy around when students have opportunities to take Algebra I falls to local district leaders (Herbel-Eisenmann, Keazer, and Traynor 2018; Turner and Spain 2020). District leaders are responsible for choices about curricula, instructional materials, and preferred pedagogical strategies (Wong, Coburn, and Kamel 2020); they must also determine how to implement state and federal policies (Spillane 1996) and respond to diverse groups of constituents (Ansell, Reckhow, and Kelly 2009).

Decision-making in district offices is an interactive process involving many people in and across meetings and informal conversations, stretching between departments and organization levels of the organization (Coburn and Talbert 2009). Decisions emerge through a series of conversations in which ways of thinking about problems take shape and ''accrete'' in incremental

steps to set the organization on a particular course (Weiss and Bucuvalas 1980). These decisions involve interpretive, persuasive, and political processes and are influenced by the configuration of decision-makers and their roles, backgrounds, and beliefs about instruction; the controversy over a decision; and broader political and organizational conditions (Asen 2015; Coburn, Honig, and Stein 2009; Daly and Finnigan 2016; Honig, Venkateswaran, and McNeil 2017; Huguet et al. 2021; Park, Daly, and Guerra 2013; Spillane 2000).

Given the contested nature of when and how Algebra I should be offered to students, district leaders weigh a range of factors. They must consider the pedagogical content and materials, schools' logistical capabilities (e.g., their ability to staff courses), and political constraints due to various stakeholders' opinions (Huguet et al. 2021). Furthermore, given Algebra I's role in stratifying student outcomes by race and class, any debate about algebra is inherently also a debate about achieving more equitable (i.e., less stratified) outcomes.

Scholars have presented various ideas about equity-centered policies in school systems. Warikoo and colleagues (2016) note that teachers' implicit racial associations can undermine equity initiatives, and Turner (2020) found that district leaders' managerial approach to equity reinforced existing inequalities. Additionally, Warikoo and de Novais (2015) describe how students' ''race frames'' influence how they perceive race, and these frames are influenced by the institutions they are learning within. Previous research has also explored the political implications and limitations of equity policies. Barton and Tan (2020), for example, argue that equity policies that prioritize *inclusion* are inherently limited. Guitton and Oakes (1995) note that conceptions of equity and corresponding policies fall along a political spectrum from libertarianism to democratic liberalism. Allbright and colleagues (2018) follow their model but add the category of transformational to denote increasingly politically progressive conceptions and policies. Research shows that equity policies are limited by the way policymakers conceptualize equity and that conceptions of equity change to meet districts' political demands (Huguet et al. 2021; Turner and Spain 2020).

We add to this body of scholarship by considering a counter case: one where political pressures were *not* the deciding factor and district leaders instead chose what *they perceived* to be the more equitable policy position despite the uphill political battle they faced to do so. Throughout their deliberations, district leaders presented different ideas about what equity could look like in mathematics, but they determined that *any* tracked middle school option would reproduce extant inequalities. Our work is not evaluative; that is, we do not analyze the efficacy of Cypress's policy decision for equity. However, by analyzing how Cypress's district leaders came to this realization, we create a deeper understanding of the role equity concerns might play in district policymaking processes overall.

CONCEPTUAL FRAMEWORK

CCSS-M served as a major environmental disruption to mathematics education. Sociologists of culture label such events ''unsettled times'' (Swidler 1986), and institutional theorists call them ''exogenous shocks'' or disruptions (e.g., Corbo, Corrado, and Ferriani 2016; Hallett and Hawbaker 2020). These theories all coalesce around one main principle: Change begets more change. In other words, when something is disrupted, that first change opens the proverbial door for further change. However, much of this previous work suggests the second wave of change often attempts to curtail the effects of the disruption, and it remains unclear when district leaders might to choose to cause further disruption.

Institutional theorists traditionally analyze these moments of change using theoretical models that highlight the ways organizations are linked to the broader institutional environment (Meyer and Rowan 1977). Earlier institutional theory argued that changes in response to environmental pressures are often made in name only, allowing schools, for example, to remain legitimate in the institutional field while maintaining stability within their organization (Meyer and Rowan 1977). More recent work, however, demonstrates that even superficial changes affect schools and classrooms (e.g., Coburn 2004; Rigby, Woulfin, and Marz 2016), and district and school leaders can tightly couple classroom activities to changes in the institutional environment (Hallett 2010). However, the conditions that lead to tighter or looser coupling remain unclear.

To clarify this phenomenon, Hallett and Hawbaker (2020) present a framework for an inhabited

institutionalism, which adds to extant models of institutional theory by including *interactions* as a primary unit of analysis, alongside institutions (i.e., ''meanings that are often taken for granted''; Hallett and Hawbaker 2020:4) and organizations (i.e., groups of people with shared purpose; Bittner 1965). They present these as three overlapping but still autonomous spheres: The extent they overlap reflects looser or tighter coupling.[4] Cypress's decision to detrack middle school mathematics can be understood as a decision to pursue a tight coupling between the institution of secondary mathematics' switch to CCSS-M and the organization's secondary mathematics policy. This decision arose through *interactions* between district leaders in their deliberations. The degree of overlap between the autonomous spheres of institutions, organizations, and interactions can change, depending on the circumstance. The theory suggests researchers analyze social interactions to understand how these relationships evolve toward a decision for tight coupling between institutions and organizational structures.

Yet this framework provides little insight into the specific mechanisms by which interactions might lead to tight or loose coupling between institutions, organizations, and interactions. We turn to frame theory to shed light on the dynamics of social interaction and the role of institutions in organizational change (Coburn 2006). The term ''frame'' refers to a construction of meaning that orients individuals to a way of seeing or understanding a problem or possible solution (Benford and Snow 2000; Coburn 2006). Framing is an active process by which people collectively construct meaning (Benford and Snow 2000). Frames are not always accepted by others; people can engage in *counterframing*, where interlocutors attempt to oppose a person's or group's assertion. Furthermore, frames have different levels of *resonance*; frames are more or less salient to an audience depending on how well the frame aligns with the audience's values or expectations. When ideas or frames are resonant, issues can become ''settled,'' but this settling is an impermanent state that can be disrupted at a later point.

Framing is an effective analytic tool for understanding the complex dynamics of deliberation within school district decision-making (e.g., Huguet et al. 2021) and for understanding how actors construct ideas about inequality (e.g., Cobb 2017; Warikoo and de Novais 2015). Frame analysis, on its own, helps us understand interactions, but without combining this analysis with the broader framework provided by inhabited institutionalism, we could not analyze how these interactions inform and are informed by the organization and institutions at hand. Frame analysis provides a way to understand the mechanism by which the tight and loose coupling demonstrated in inhabited institutionalist models is achieved. Thus, we contribute to the literature on inhabited institutionalism by demonstrating how combining this framework with frame theory helps transform a robust theory into an even more generative tool.

RESEARCH DESIGN

We investigate how district leaders came to detrack middle school mathematics by drawing on data from a 2.5-year study of Cypress School District's instructional decision-making efforts in mathematics teaching and learning.

State and District Context

In 2008, the California State Board of Education passed a motion, commonly known as Algebra-for-All, that required all eighth-grade students to take the Algebra I assessment beginning in the 2011–2012 school year. The motion was overturned in May 2010, but some school districts chose to adopt their own Algebra-for-All policies. Also in 2010, California adopted the CCSS-M, with a planned transition to CCSS-M in 2014–2015. Adoption of these new standards and assessments presented significant changes for school districts: The new standards covered fewer topics in each grade but would go deeper, and topic areas and content shifted to different grades (Warren and Murphy 2014). These changes required new instructional materials, significant educator professional development, and expanded assessment infrastructure.

We conducted our study with Cypress School District in 2012–2015, key years in the transition to new CCSS-M standards and assessments.[5] At the time, Cypress was a midsized urban district in California, educating more than 50,000 students. The district's student body was racially and socioeconomically diverse, with 35 percent Asian or Asian American, 25 percent Hispanic or Latino, 10 percent black or African American, 10 percent multiracial, and 15 percent white students; approximately 55 percent of students were

Table 1. Description of Observations.

Event type	Number of observations	Number of hours	Typical attendance
District department meeting	39	120	Members of a central office subunit (e.g., mathematics department or leadership team)
Task- or topic-specific meeting	41	91	Sometimes cross-department representation; focused on a particular topic or task (e.g., algebra task force)
Professional development session	18	64	Teachers and/or school leaders, district leaders, depending on focus
Meetings with external partners	30	53	District leaders and different external partners
Shadowing district leader	8	44	NA
Total	97	372	

Note: This table demonstrates a breakdown and description of the various observation types in the sample.

eligible for free or reduced-price lunch. Cypress district leaders were grappling with how to adjust their instructional program to reflect the recently adopted standards. Like other districts, Cypress had previously adopted an Algebra-for-All policy, which placed nearly all students in Algebra I in eighth grade. Cypress achieved this outcome by having students skip the eighth-grade mathematics content of the 1997 California standards to start algebra in eighth grade instead. With this acceleration, students could take AP mathematics courses during high school. However, with the adoption of CCSS-M, algebra standards were now represented in both Mathematics 8 and algebra courses. The district needed to align their course sequences and academic content with the new standards. A district task force was charged with reconciling the district's current Algebra-for-All policy with the new CCSS-M standards and putting forth a policy solution.

During our study, the algebra task force met regularly to make sense of and develop a new policy that would provide a plan for the district's response to CCSS-M. This task force included members from several departments in the Cypress central office, including curriculum and instruction and school leadership, and actors in a range of roles, such as teachers on special assignment, program administrators and directors, and partners external to the district.[6] Members of the task force held several planning meetings where they negotiated the ''algebra issue'' and concurrently worked on drafting a policy paper. Toward the end of this period, they shared the draft with other district leaders for feedback and began putting together an implementation and communication plan. Members of the task force presented the paper to the school board, where it was approved and adopted as district policy.

Data Collection

The close proximity of one researcher to the Cypress School District enabled sustained, in-depth observational fieldwork (Barley 1990). When we began the study, we met with key district leaders to identify where conversations related to mathematics teaching and learning were occurring. We began attending these meetings and asked if we could attend other events as we learned of them and built relationships with district leaders. As outlined in Table 1, over the 2-year period, we observed 372 hours of district mathematics activities, the majority by Caitlin Farrell.[7] This fieldwork included different department meetings, meetings focused on a particular task or topic (e.g., assessment committee), professional development offerings, and meetings with external partners related to mathematics teaching and learning. We also spent 44 hours over 8 days shadowing district leaders who had mathematics responsibilities.

Fieldnotes from these meetings include details about meeting context, topics discussed, and participant behaviors and collected artifacts (e.g., meeting agenda). Although not recorded and transcribed, observers captured dialogue in their fieldnotes as accurately as possible. All data were entered into Dedoose, a qualitative data analysis platform. All names are pseudonyms for individual and district confidentiality.

Data Analysis

We first coded all data gathered for the central mathematics issues under deliberation in the district during the time of the study. We created decision trajectories, a detailed collection of all the observational data related to a given topic, arranged longitudinally. Using these decision trajectories, we could follow each deliberation from the first observed meeting through the negotiations that occurred over 2 years (Huguet et al. 2017, 2021). One trajectory focused on the Algebra I debate. Next, we identified smaller analytic samples we called *episodes* (for a similar process, see Huguet et al. 2021). Episodes were segments of fieldnotes containing sustained discussions around a given topic. A segment was sustained if it included at least five contributions to the conversation on the same topic. A typical meeting had multiple episodes because people tended to shift topics in planned (i.e., per the agenda) and impromptu ways. For this study, we analyzed 41 episodes focused on the Algebra I decision-making trajectory.

We analyzed each episode in the algebra trajectory chronologically, identifying the specific diagnostic (problem) and prognostic (solution) frames (Snow and Benford 1988) deliberators articulated, plus any justification or reason given for that comment. For example, one leader offered this diagnosis of the problem created when the district shifted from old standards to CCSS-M: ''We currently have algebra in eighth grade. . . . It's no longer possible to skip Mathematics 8 because then students won't be prepared, they'll miss content.'' In contrast, a prognostic or solution frame highlights the suggested course to pursue. One district leader offered this solution frame as a response to the identified problem: ''It should be the recommendation of [our department] to have all students in Mathematics 8, which is not a remedial class.'' In all, we identified 788 diagnostic and prognostic frames.

Next, we coded the frames and the reasons district officials gave for those frames using inductive methods. Four topics arose in their discussions: pedagogy, equity, political viability, and logistical viability. We defined *pedagogical discourse* as having to do with leaders' ideas of mathematics teaching and learning, including the sequence, content, or structure of mathematics courses. We coded *equity discourse* when leaders discussed making algebra more equal, fair, or just in the eyes of the speaker or group. *Political discourse* reflected concerns related to district politics and perceived political demands from different constituencies. Finally, we coded *logistical viability* when participants discussed the practicality of a solution given logistical considerations or constraints at schools or in the district broadly (e.g., financial resources, scheduling challenges). We coded for the valence of the main frames and reasons in each episode (i.e., was it mentioned positively or negatively, whether something should happen or not) for each issue mentioned.

Next, we coded the degree of resonance within each episode, following Coburn's (2006) strategies. *Lack of resonance* occurred in an episode when multiple frames were in play, there was explicit disagreement or concern, leaders raised questions about a frame, individuals offered counterframes, or there was limited ''building on'' of reasons or connections to other frames. *Some resonance* occurred when one leader offered a frame that others took up and invoked later, individuals added on additional reasons to a frame, or there were explicit indicators of frame resonance (''I agree . . . ''). *Much resonance* occurred when someone explicitly summarized that the group was in agreement about something, they decided to take specific action steps as a result, the range of options narrowed or shifted in line with the frame, or the focus of the debate shifted. Within and across episodes, we considered the frames at play, their valence, and the level of resonance to understand the different constraints district leaders were negotiating. Finally, we inductively determined district leaders' conceptions of algebra through each round of coding, eventually finding they discussed algebra as a discrete course, a string of content, and a gatekeeper. Throughout, we engaged in ongoing memoing and regular

meetings to discuss findings, review data, and consider alternative explanations.

FINDINGS

The switch to CCSS-M disrupted the way district leaders thought about the institution of secondary mathematics and specifically algebra. Previously taken-for-granted ideas around algebra were suddenly up for debate. When district leaders shifted from an understanding of algebra as a course to algebra as content across K–12, it opened the door for new policy options. This time of district decision-making was not a free-for-all; it was constrained as leaders negotiated organizational concerns of equity, pedagogy, logistics, and political viability. In the end, district leaders chose to prioritize equity and pedagogy over political concerns, resulting in moving algebra to ninth grade and completely detracking middle school mathematics courses.

Changing Conceptions of Algebra

CCSS-M disrupted the institution of secondary mathematics, which was reflected in the task force's deliberations. Leaders shifted from viewing algebra as a discrete course, which they acknowledged served as a gatekeeper to secondary mathematics, to viewing it as a string of content woven throughout students' mathematical careers. Given that mathematics as a school subject is uniquely regimented and structured, the scale of this change is difficult to overstate. Toward the beginning of deliberations, district leaders referenced algebra as a discrete course 14 times—all in statements acknowledging their past thinking about algebra or discussing the way the community/teachers thought about algebra. They also discussed Algebra I as a gatekeeper: Within the current course pathway, the year students took Algebra I determined how far they advanced in high school mathematics. Noted one leader, ''*in the past* California and [Cypress] believed that algebra [the old course based on prior 1997 California mathematics standards] was the vehicle for access to all students. . . . It's not just that algebra *was* our only gatekeeper; there were others.'' District leaders used the term ''gatekeeper'' to refer to algebra seven times throughout the deliberations.

Given the new conceptualization of algebra presented by the CCSS-M, this shared, deeply institutionalized understanding of ''algebra the course'' that served as a ''gatekeeper'' to higher mathematics classes was no longer taken for granted. Instead, leaders began to discuss algebra as a sequence of ideas that would spiral throughout the grades. As one district leader explained, CCSS-M encouraged a shift to seeing algebra as a ''way of thinking'' rather than a discrete course: ''Algebra is not a course but a domain of mathematics from K–12. It's not just about algebra in eighth or ninth grade; it's a set of ideas that build, that are articulated thoughtfully in CCSS.'' Given this new understanding of algebra, students would not be able to skip any courses during their secondary pathway to accelerate. Algebra as a sequence of ideas was referenced 23 times.

District leaders recognized the changes in how they were thinking about algebra and how they would need to help others in the district adjust their thinking, including students, teachers, school leaders, and parents. At several points, district leaders referred to this change from the course algebra to algebra as a sequence of ideas as ''the shifts'' associated with CCSS-M, ''the changes in Common Core,'' or through comments like ''this is not like the old math.'' For example, in one meeting, task force members met with middle school principals to share an update on the upcoming transition to CCSS-M. One mathematics district leader and member of the task force explained: ''There's an underlying change in thinking [with Common Core]. Before we go forward, we need to talk about, what is algebra? Algebra is a strand of mathematics, not a class.'' She went on to articulate the differences between the content covered in the current Algebra I course offered in eighth grade and how algebra content was spread across multiple courses in middle and high school under CCSS-M. Whereas the old, pre-Common Core Mathematics 8 was a prealgebra class designed to reinforce skills, which students could skip, CCSS-aligned Mathematics 8 would be a much more rigorous class that would cover a full third of the old eighth-grade algebra content. She concluded, ''This is really important: this [eighth-grade CCSS course] is not a prealgebra class.'' Given the ways algebra content was aligned horizontally across courses, students hoping to take Algebra I before high school could not simply skip Mathematics 8.

In summary, the switch to Common Core State Standards disrupted the way district leaders thought about algebra. The new conception of

algebra as content across K–12 classes meant the prior policy—skipping the eighth grade, prealgebra mathematics course—was no longer an option. This set the stage for a rethinking of the mathematics course pathway and a renegotiation of how mathematics worked in the district.

Changing Mathematics Policy and Navigating Organizational Concerns

Inhabited institutionalism would suggest the institution-level shift to CCSS-M would be affected by district-level organizational concerns and interactions. As such, the district's deliberation was affected by shifting conceptions of algebra, as described in the previous section, and by extant aspects of the organization. We argue that these aspects were *not* disrupted by the switch to CCSS-M. Throughout the deliberation, participants discussed several questions: Should the district continue to offer algebra in eighth grade despite changes in state policy? If they did not, should there be another option for students to accelerate, and when would it be offered: middle school and/or high school? How could they ensure changes to the course pathway served the needs of all students, not only those who had historically done well in mathematics? Our analysis of the frames around these questions reveal the political, logistical, pedagogical, and equity considerations that decision-makers navigated. These organizational concerns guided the development of their policy decisions.

First, district leaders framed problems and solutions around the *political viability* of an idea. This included frames around the feasibility of different ideas given perceived district politics, which were not affected or disrupted by the shift to CCSS-M. For example, district leaders perceived that many parents wanted their children to take higher-level mathematics to increase their chances of being accepted into a competitive college, a deeply institutionalized idea in their community. The specific demographics of these parents were not mentioned *each* time the topic arose. However, it was clear the parents of concern were the white, Asian, and affluent parents of the students currently enrolled in advanced mathematics courses. For example, one district leader, speaking as a potential dissenting parent, said, ''I'm a white middle-class parent, and I want my kid to succeed!'' District leaders were keenly aware of this concern and of the power these parents held as a stakeholder group, so many of their discussions involved frames around parent reaction to potential policy changes. One district leader offered the following frame: ''CCSS Mathematics 8 as a course that's more rigorous [than the prior algebra course based in earlier standards]. . . . It's going to be a hard public conversation because parents believe that their students are ready to skip Mathematics 8.'' This district leader was concerned about parents' reactions to taking away the option to skip from seventh-grade mathematics to algebra. The current ability to skip provided a way to accelerate through the course pathways and access higher-level mathematics courses in high school, including AP Calculus. Thus, task force members were conscious of the political viability of any new secondary mathematics pathway—particularly with parents who may have held ideas about algebra as a gatekeeping course.

The second set of frames focused on *logistical viability* issues, including the feasibility or practicality of different ideas due to district financial or scheduling constraints. These frames focused on budgeting, teacher availability, and space concerns within schools. In one exchange, the task force discussed how offering different compression[8] options would require schools to allocate staffing and funds to support an instructor for a course that might be capped at a low number of students. For example, one task force member offered the following prognostic frame: ''The reality check is . . . a lot of schools can't create a class only for 10 percent of their student bodies. [If a grade only had 120 to 150 students], that might only be 12 to 15 kids.'' She framed the problem with compression as a logistical one: Not all schools in the district had the resources to support offering such a small class, making it logistically difficult to set a percentage cap for an advanced course across all schools in the district. These logistical issues were extant elements of the organization and were not disrupted by the switch to CCSS-M.

The third set of concerns was *pedagogical*. Frames offered around pedagogy spoke to the structure, sequence, content, or developmental appropriateness of the curriculum. Some aspects of these pedagogical concerns did not change, but the specific *nature* of their concerns over pedagogy changed with the switch to the new standards. For example, under the old California standards, students could skip Mathematics 8, but the

new CCSS-M curriculum meant the class was an essential course for students to take. One district leader explained: ''From the old course of algebra, some of that content is now in CCSS-M 8, CCSS-M algebra. It's no longer possible to skip CCSS-M 8 because then students won't be prepared, they'll miss content [in the domains of algebra or geometry].'' Discussions of developmental appropriateness included concerns about the various course options the district could offer in middle school. Skipping courses was determined to be a nonstarter, but district leaders also raised concerns about developmentally appropriate mathematics course pathways. In a debate about whether to offer middle school compression options, one district leader argued: ''We know that these standards were written with developmental needs in mind so that the students will get the right standards at the right age. So, we want to stay away from acceleration in the middle schools.''

Finally, district leaders framed the algebra issue in terms of *equity concerns*. This included frames around making the algebra experience more fair or just in the eyes of the speaker or group. Equity concerns were not new to Cypress; under the earlier Algebra-for-All policy, district leaders hoped that providing access to all students by eighth grade would be more equitable. During the study period, some district leaders offered ideas for a more equitable tracking system, but others argued that it was not possible to have equitable tracking. For example, in one meeting, a district leader used a diagnostic frame to argue that the district needed to consider equity in terms of representation in advanced courses:

> You can see it when you look at the end courses—who is in AP Calculus? AP Statistics? Even if there are only 10 percent of Latino, African American kids in the school, there aren't 10 percent of the kids in calculus. So, because of the dissonance that's happening with eighth grade, we want to reexamine the middle and high school mathematics courses.

He then offered a prognostic frame, arguing they should examine the secondary course pathways by drawing on data that highlighted the inequitable stratification of students in advanced mathematics courses by race and ethnicity.

District leaders also advocated delaying tracking until high school, reasoning that older students were more developmentally prepared to decide to accelerate in math. One district leader stated: ''This is about social justice and equity—where are the decision points to allow all kids to get to AP [or other advanced mathematics courses], so that it's not a decision made only in seventh grade, or that depends on your particular school.'' Other district leaders were adamant that any kind of tracking would become inequitable as it played out at the school level; in their eyes, tracking would inevitably be stratified by race and class.

Throughout this discussion, district leaders presented divergent ideas about achieving equity. Some task force members focused on detracking, and others advocated different ways to diversify advanced mathematics, but no one disagreed that equity, which had long been an important factor in Cypress's decision-making process, was of paramount concern.

Framing and Counterframing in the Policy Debate

Previous research suggests district administrators would prioritize political viability over other concerns (e.g., Turner and Spain 2020), but we saw the opposite unfold at Cypress. Analyzing this unlikely outcome through the model of inhabited institutionalism, we find the decision-making process was mediated through the disruption wrought by CCSS-M, shifting conceptions of algebra (an institution), and organizational concerns. Through frame analysis, we see how this unfolded: The four organization-level concerns discussed in the previous section became *constraints* on the search for a policy position consistent with this new understanding of algebra because only solutions that satisfied at least three of the four concerns achieved resonance with the group. Ideas that satisfied none or only one of these constraints were the least resonant. Table 2 shows how these constraints led to a decision that prioritized pedagogy and equity over political viability.

At the beginning of the task force meetings, district leaders agreed they would have to offer some kind of ''honors'' or accelerated option. However, as they deliberated each potential middle school accelerated option, a core tension emerged between which option they saw as best for both equity and pedagogy and which they thought was most politically viable. By the end of the meetings, the former had won out: The

Table 2. Mathematics Policy Options and Constraints.

Policy option discussed	Political viability	Logistical viability	Pedagogy	Equity
MS acceleration option (skip Mathematics 8)	✓	X	X	X
MS compression options	✓	X	X	X
No MS honors; honors in HS	X	✓	✓	✓

Note: This table demonstrates mathematics policy options and indicates whether these options satisfy the four constraints. X indicates the condition is not satisfied, and ✓ indicates the condition is satisfied. MS = middle school; HS = high school.

only option district leaders considered pedagogically sound, equitable, and logistically viable was Mathematics 8 for all students, a solution that detracked middle school mathematics.

We found that acceleration and compression options were seen as politically viable but not sufficient for equity, pedagogy, or logistical viability. District leaders eventually agreed on acceleration through compression of standards instead of the past practice of skipping standards. Near the beginning of the meetings, one district leader offered this frame regarding pedagogical problems with accelerating students, and there was widespread agreement among the group:

> There are a lot of parents and teachers who want to accelerate kids by skipping grades. With CCSS, the content of each grade must be taught for the kids to be ready for the next. It's not like eighth-grade general mathematics. It's not a repeat of seventh-grade standards that they could skip. They can't do that with CCSS-M. The eighth-grade topics, they'll need all of them for high schools.

Given the new content CCSS-M included in Mathematics 8, district leaders agreed it would be detrimental for students to skip that material. Although they believed privileged parents would still want their children to skip this coursework to get ahead, it was both inequitable (a limited number of students would be able to accelerate, and those few were likely to be white, Asian, and affluent students) and put a strain on the district's logistics in terms of scheduling.

District leaders quickly coalesced around the decision to not offer options for skipping content, but they deliberated for months over compression options. They explored combinations of Mathematics 7, 8, and algebra, such as compressing Mathematics 8 and algebra into one eighth-grade course or compressing three courses into two middle school years, but they found each middle school compression option had pedagogical, equity, or logistical problems.

In terms of pedagogy, task force members argued that middle school compression could make children dislike mathematics or sacrifice depth in their learning. After one district leader suggested a compression course in which students do ''more'' mathematics, another task force member countered: ''I'm wondering about that statement that the kids are going to do 'more' mathematics in a compressed class. I mean, realistically, teachers are going to have to choose and combine the two courses, meaning there will be less time to do the investigations and tasks.'' Another district leader offered this counterframe: ''We can't turn our students off of mathematics,'' arguing that stressing students out by moving too quickly would cause them to dislike mathematics.

District leaders also articulated concerns about logistical viability and equity issues with compression options. Due to schools' varying sizes in the district, some might have a hard time meeting a 10 percent (or any specified percentage) threshold for the compression option. This logistical concern was also related to an equity concern: Which kids would be included in that 10 percent? Two task force members elaborated on the complexities of this issue:

> *Task force member 1:* If you go higher than 10 percent, you'll exclude Latinos and African Americans because of race and include Asians and whites because of race.
>
> *Task force member 2:* It's not a problem with 10 percent, but the problem is in schools where that is too small a number.

Task force member 1: If a school will make a class of 30 students, they must make it diverse.

Task force member 2: That blows the 10 percent. The reality is, we can't hold a school to 10 percent.

District leaders perceived an equity issue with a percentage cutoff because the dynamics of structural racism and classism would likely mean students enrolled in the smaller class would be Asian, white, or affluent, whether through merit or through their parents' insistence. One member explained this dynamic in a discussion of the district's tracking prior to Algebra-for-All: ''The idea that we could place those kids in bonehead mathematics, that's led to evil consequences. When the system makes choices for people, that leads to racism.'' He expressed a need to make classes racially diverse, but another member countered, saying that by prioritizing diversity, there was no way to keep class sizes down. They concluded that compression would not be pedagogically appropriate, equitable, or, in some cases, logistically viable.

Some district leaders explicitly advocated *for* detracking middle school mathematics, rather than just *against* compression options, for equity reasons. They acknowledged the Algebra-for-All policy had not created equity because 50 percent of students failed, repeated the class, and often failed again. One district leader explained, ''So when we had all kids placed into algebra, we went from 'evil to bad.' But, we want to go from bad to good now. What's good?'' Early on, district leaders agreed that Algebra-for-All did not solve the equity problem, but they were not sure how to best proceed. Some district leaders saw the changing standards as an opportunity to continue prioritizing the equity work they had started with Algebra-for-All. One district leader explained:

> It's an opportunity to think about not tracking. This is about social justice and equity—where are the decision points to allow all kids to get to the AP track, so that it's not a decision made only in seventh grade. . . . So we need to understand deeply the mathematics that make eighth grade CCSS-M different . . . how can we see this policy from the social justice perspective, to more equitable outcomes?

Other district leaders countered this position, arguing that leveled courses would continue to allow middle schools to meet students' individual needs, but there was a consensus that advanced students would not be actively harmed by detracked middle school mathematics. As one leader explained, ''Every classroom is better with a range of thinkers and do-ers. It's valuable to have all kids in there.'' They also agreed that waiting to track courses until high school was developmentally appropriate and more equitable: ''In high school, teachers have a better sense of the mathematics. Kids are more mature. There could be other options there—compressing 9, 10, 11 into two years or compressing Algebra 2 and precalculus into one year.''

At first, district leaders felt hemmed in by the political need for some kind of advanced course, with one participant calling this a ''political reality.'' This set up the core tension mentioned earlier: pedagogy, equity, and logistics on one side and political viability on the other. After trying to find a compression option, district leaders rejected this politically viable harm-mitigation strategy in favor of a solution that was pedagogically sound, equity oriented, and logistically possible. The district superintendent eventually expressed support for a detracked option, and to combat what they saw as a lack of political viability, district leaders created a marketing strategy that focused on rigor and academic benefits. A high-level leader explained: ''For them [privileged parents], they see this as an issue that will make them leave the school district. We want the message to be: 'no more honors is good for all students.''' Another leader rephrased the message: ''Right, *every student benefits*.'' District leaders could not find a way to make compression or acceleration equitable, but they attempted to make detracking politically viable through concerted communication.

DISCUSSION AND CONCLUSIONS

Our case study is, in effect, a countercase: Prior research on educational inequality or institutional change would not predict the decision to detrack middle school mathematics in the wake of the disruption of CCSS-M. Instead, previous literature suggests district leaders would likely make politically motivated policy decisions even if they

maintained inequalities or remained loosely coupled to the new mathematics standards (Lewis and Diamond 2015; Lucas 2001; Meyer and Rowan 1977; Turner and Spain 2020). To uncover how this surprising decision occurred, we used a blend of inhabited institutionalism and frame theory to analyze district leaders' interactions as they deliberated mathematics policy in response to CCSS-M. We build on prior research that shows how disruption in the institutional order can lead to further change (e.g., Corbo et al. 2016; Hallett and Hawbaker 2020; Swidler 1986) by uncovering how individuals within an organization negotiated such a change. Specifically, we analyze how negotiation can lead to a decision for organizational policy to be tightly coupled with institution-level changes in secondary mathematics even when this is not the only or most parsimonious option.

On its own, inhabited institutionalism is an important framework for understanding the interrelated nature of interactions, organizations, and institutions. We extend this framework by combining it with frame theory to analyze this interplay from the ''bottom up.'' We demonstrate not just that interactions are essential aspects of institutional life but also that they are key to understanding the mechanisms that lead to change. Even as district leaders' interactions were constrained by extant elements of the organization, these interactions were the mechanism by which CCSS-M became fully embedded in the organization. District leaders, via constrained interactions, crafted a policy that reconceptualized algebra, changed the content and sequence of mathematics courses, and changed how students moved through their middle school mathematics coursework over time. In so doing, the deliberation more tightly coupled the district organization with the policy environment. Future research on inhabited institutionalism might benefit from this pairing with frame theory to fully explore the ''recursive relationships'' between organizations, institutions, and interactions (Hallett and Hawbaker 2020).

By using this model to analyze district leaders' frames around logistical, political, pedagogical, and equity-related concerns, we demonstrated that district leaders' negotiation itself was shaped and constrained by extant aspects of the organization. In this way, we contribute to the literature on disruptions by illustrating how these events do not necessarily exist in a binary state (e.g., disrupted or undisrupted), as the literature commonly predicts (Corbo et al. 2016; Swidler 1986). Instead, disruptions can occur to one or more aspects of an organization. In this case, district leaders' negotiation of the disruption of CCSS-M was constrained by elements of the organization that were not disrupted. We do not claim to prove causality, but it is possible the adoption of CCSS-M constituted a *constrained disruption*: It unsettled some elements of the organization and not others. In so doing, it allowed district leaders, who were already primed to care about equity, leeway to make a controversial but potentially more equitable decision. Future research could test this theory by analyzing district decision-making amid different scales of disruption. In particular, research looking at the 2019–2020 and 2020–2021 school years could investigate how change occurred when school districts experienced a much larger disruption due to the COVID-19 pandemic.

Our research contributes to an understanding of the social construction of school subjects. Scholars have argued that school subjects are social constructs open for interpretation in both the broader, societal sense (Apple 2004; Gumport and Snydman 2002) and in specific classrooms (Coburn 2006), but less work has analyzed different constructions of algebra and the subsequent district policies. In this article, we examine a moment in which the mathematics course pathway drastically shifted for the purpose of both pedagogy and equity. Mathematics has distinctive qualities as a school subject: People see mathematics as ''objective,'' yet they hold gendered and racialized biases about who is good at it, making it both susceptible to equity issues and difficult to change. Given this, *policymaking* around mathematics and algebra is distinctive and distinctly thorny. We demonstrate the critical role district leaders play in the construction of such a highly contested school subject in terms of academic content and the policies governing which students take which classes. We demonstrate that times of curricular or standards change can make space for a renegotiation of previously constructed ideas about school subjects. Many factors come into play during this renegotiation, including pedagogy, equity, politics, and logistics, suggesting again that school subjects are much more than their academic content.

We also advance research at the intersection of equity and mathematics. Prior research has attended to racial and socioeconomic gaps in mathematics course-taking, the informal processes by which students are sorted into leveled courses,

and the strategies those in power use to maintain that power, like opportunity hoarding or what Lucas (2001) calls ''effectively maintained inequality'' (see also Lewis and Diamond 2015; Lewis-McCoy 2014). We add to this by analyzing how these formal policies are decided on in the first place. By detracking middle school mathematics, Cypress shifted the meaning and consequence of algebra: It was no longer a discrete course and, as a result, lost some of its standing as a gatekeeper. This change did not solve all the equity problems around mathematics at Cypress, but such a policy may go a long way toward eliminating some of the ways inequitable policies reproduce inequalities.

Other research on the role equity concerns play in district policymaking focuses on how district leaders' conceptions or understandings of equity affect policy decisions (e.g., Allbright et al. 2018; Guitton and Oakes 1995; Turner and Spain 2020) or interrogates what true equity would look like in schools (Barton and Tan 2020). We add to this literature by demonstrating how conceptions of equity play out not in isolation, but in relation to conceptions of pedagogy, political viability, and logistical viability. District leaders presented divergent ideas about what equity could look like in mathematics, but they concluded that only detracked eighth-grade math had the potential to be both equitable and pedagogically sound. Our findings demonstrate that what is perceived as the most equitable choice is not always at odds with the most pedagogically appropriate choice. In such cases, district leaders might be able to leverage the pedagogical benefits for students to make equitable policies more politically viable. The case of Cypress is not generalizable to most of the country, given the district's documented long-standing concerns about equity, but it could be generalizable to other diverse districts (Herbel-Eisenmann et al. 2018). Future research could explore this hypothesis, analyzing whether district leaders in various contexts leverage pedagogical strength to advocate for more equitable policies.

RESEARCH ETHICS

All human subjects included in this study gave their informed consent, and we took several steps to protect their anonymity, as detailed in our approved institutional review board proposal.

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NOTES

1. Cypress is a pseudonym.
2. In total, we observed 372 hours of district leader deliberations, around 100 of which were specifically on the topic of algebra.
3. We say *prioritized* equity because, of course, a middle school detracking policy does not *guarantee* equity.
4. Hallett and Hawbaker (2020) expand the traditional idea of tight or loose coupling, which referred to the core of the organization and the environment, to include interactions.
5. Cypress was part of a larger project focused on instructional decision-making in three districts working with external partners. For this article, we drew on a subset of our data around new research questions and analytic strategies.
6. District leaders' race, gender, and other aspects of identity likely shaped their participation in these deliberations. However, we did not ask meeting participants how they self-identified. We believe it would be inappropriate to ''assign'' these identifying characteristics to participants based on our own perceptions. This is an important consideration for future research. Additionally, we did not explicitly ask district leaders about the specific responsibilities they each held, so we cannot comment on this. Given that this is a contentious topic and the group in question was rather small, any additional

details would risk breaching our participants' anonymity.

7. Farrell conducted over 95 percent of the observations in Cypress. Researchers on the original study of the three districts engaged in multiple activities to develop shared understandings and practices around fieldnoting, including level of detail and areas of interest.
8. The task force discussed creating compression options (e.g., two courses offered in one year, like CCSS Math 7 and CCSS Math 8) so students could accelerate and thus take calculus or other higher-level courses in high school.

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