ANARCHIST MATHEMATICS EDUCATION: ETHIC, MOTIVATION, AND PRAXIS

By

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ABSTRACT

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Anarchists and (mathematics) education researchers generally share convergent interests regarding social (in)equality—that is to say, both groups share a concern over noticing inequality and making efforts to pursue social justice. In this dissertation, I employ three tenets of anarchism (cooperation; mutual aid; freedom from unjustified, coercive hierarchy) to formulate and live out the beginnings of a mathematics education research approach rooted anarchism, in pursuit of the larger goal of developing cohesion between my anarchist worldview and the possible/probable products of a career in research. In so doing, I aim to simultaneously: (1) Respond productively to critiques of mathematics education as atheoretical, (2) articulate one possible cohesion between anarchist worldview and research methods, (3) unsettle some of the taken-for-granted assumptions of the mathematics education research community, and (4) invite others into more radical forms of anti-oppressive research and praxis.

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PREFACE

To introduce this doctoral dissertation, a dissertation which could conceivably either in its superficial details or its holistic being elicit passionate normative backlash, it is necessary to take a moment to reflect on two things: (1) What purpose(s) dissertations serve, and (2) how these purposes are accomplished. It troubles me to live in a world where the very things educational researchers have learned over decades/centuries/millennia of passionate and disciplined inquiry are not typically reflected in the practices that enculturate new generations into our work – I wish to see learning valued over assessment, relationships valued over authority, and heterogony valued over homogeny. It troubles me to see standard practice that reifies the very notions and values that our collected works might be said to stand against – I wish to see creativity and diversity valued over cis-hetero white western parochial male normalcy, vulnerability valued over power, and action valued over some imagined isolation of the self from the observed. It troubles me, in short, to participate in and propagate the echoes that trap us in the violence of the past.

If I were to synthesize the purpose of a doctoral dissertation (the cumulative object comprised of both process and product) into a single word, that word would be "learning." I do not propose this observation to be reductivist, but instead to gesture in a particular ideological direction. A dissertation is a space for doctoral students to share pieces of what they have learned with others. A dissertation is an opportunity for a doctoral student to learn through interrelated investigation and articulation, an opportunity to experience mentored investigatory discovery as well as articulation as "a method of discovery and analysis" (Richardson, 2000, p. 923) in of itself. A dissertation, published or otherwise shared, is an opportunity for others to learn through

engagement with the ideas, findings, and passions of the writer. That is to say, dissertations are of and for learning.

Where, then, is the problem? I will answer first in broad terms, then narrow to the personal. In short, dissertations commonly reconstruct and reify a vision of learning now long outdated both empirically and ethically. Often, dissertations accomplish learning through telling (Sfard, 1998), variously through faculty feedback expressed as closed commands throughout the process and through the dissertation author telling readers what conclusions to draw in closed terms. Dissertations commonly embody Freire's (1970/2000) banking model of education, where knowledge is a gift bestowed by those who consider themselves knowledgeable upon those they consider to know nothing, only to be evaluated by those who consider themselves still more knowledgeable. Such commonplace dissertations are stultifying (Rancière, 1991), reproducing violent social hierarchy within their very structure, even when the words and sentences embedded within stand nominally against hierarchy.

As one might imagine, these problems are drawn into sharp focus in the context of a dissertation rooted in an explicitly anarchic theory of action (Bowers & Lawler, 2020; Freire, 1970/2000). Bound up as I am in a "hyper- and pessimistic activism," (Foucault, 1983) I find myself compelled to both resist these norms and help carve a trail towards brighter futurities (Patel, 2016), even as I remain convinced that I am at least as likely to simply reproduce the old norms in new form. Though I have had the privilege of finding and forming a dissertation committee open to (and even committed to) radical reform, in my broader experiences within and beyond graduate school I have keenly felt tension between the stated goals of our educational system and the influences thence observed. In truth, it is these personal experiences

that stand as the driving force of what I aim to accomplish here, even as these experiences might be conceived as reflections of the broader normative systems outlined above.

Thus, my goal here is to craft a dissertation rooted (as much as possible) in the axiom of radical equality (Rancière, 1991) and in a vision of learning as enculturation and participation (Sfard, 1998). Consequently, I do not pursue my goal of learning about and sharing ideas about *anarchist mathematics education* through telling, or at least not only through telling. My goal is not per se to say to the reader in precise terms what anarchist mathematics education is (e.g. Lawler, 2019; Restivo, 1998). Instead, I will aim to embody (as much as possible) a culture of anarchist mathematics education. I will aim to be an anarchist mathematics educator and to invite others to participate in anarchic mathematics education.

To give an initial sense, a silhouette, of some of the choices I made in pursuit of this goal, I offer the following questions which have guided my choices:

- Is *anarchism* a noun or a verb?
- In what ways might an anarchist mathematics educator treat (or enact) the discipline of mathematics?
- In what ways might methodology craft and reify hierarchy?
- In what ways might aesthetic craft and reify hierarchy?
- In what ways might choice of audience craft and reify hierarchy?

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CHAPTER 1: INTRODUCTION

Having offered in the preface an initial vignette of my motivations and intentions – an impressionist portrait with no defined border – I now aim to more precisely frame and outline the contents of this dissertation. I organize this framing as follows: (1) I elaborate on anarchism as a theory of action, and why I perceive value in its use as such; (2) I introduce the contents of the dissertation; and (3) I offer a synthesis of the holistic story (intended to be) conveyed and performed through this dissertation, as a product and as a performance, tying the contents back to my theory of action.

Construction Lines: Anarchism as a Theory of Action

In this section, I speak to the forces that guide the inertia of the brushstrokes taken heretofore and hereafter. For a dissertation rooted in empirical norms and methodology, these forces might be elaborated through *guiding questions* and *methodological assumptions*. For this dissertation, rooted as it is in humanities-oriented research norms (AERA, 2009) and activist motivation (Cox, 2014), I will elaborate through a *theory of action*, for "just as the oppressor, in order to oppress, needs a theory of oppressive action, so the oppressed, in order to become free, also need a theory of action." (Freire, 1970/2000, p. 185)

As a student, as a teacher, and now as a researcher, I spent many hours considering *theories of action* in my professional work, mostly through the proxy of the question "how do I make a positive difference in the world," or yet more broadly, "how do I do *good* in my professional contexts?" As an early-program graduate student, I spent several conferences pointedly asking the former question of each of the incredibly well-respected and well-established equity scholars I had the opportunity to meet. I was shocked by the number who not

only had no answer, but went so far as to reject the question entirely… "Ultimately, what we are doing is a job, and you must do the job." In other words, the opportunities they perceived for making a positive difference through research were so limited, they seemingly had to rationalize away the question. There was a disconnect, a lack of cohesion, between their worldview (e.g. goals pertaining to social justice) and their research (Bowers & Lawler, 2021a; Stinson, 2020; Walter & Andersen, 2013).

Noticing this disconnect between worldview and method led me to my own answer, for in critically engaging with one's worldview, "the frantic search that novice (and even seasoned) researchers experience in selecting theoretical frameworks and methodological approaches more times than not becomes self-evident and trivial." (Stinson, 2020, p. 13) Reflecting on my own practice, and noticing the contexts of activism wherein my worldview and actions are felt as cohesive, I had arrived at my theory of action: Anarchism.

The foundation and cornerstone underlying my theory of action, is, in some sense, simple: Hierarchy is inherently violent (Patel, 2016), insofar as it tautologically values some (humans, species, things, etc.) over others, and consequently opposition to hierarchy should be a driving force of work whose aim is freedom rather than oppression (Freire, 1970/2000). This sort of anti-hierarchical (anarchist) theory of action already exists across the connective tissue of equity work in mathematics education (Bowers & Lawler, 2021b) and, perhaps, equity work more broadly, but is typically left inexplicit. By grounding my research method in anarchism, I would have a theory of action giving positive direction to my work, providing a cohesion between who I am and what I do (Vellanki & Fendler, 2018).

What is Anarchism

For the purposes of this dissertation, I place emphasis on anarchism as a guide to social relations, focusing on interpersonal relationships rather than institutions (e.g. the state). I view anarchism as a mode of human organization and social self-determination, rooted in the experiencing of daily life (Suissa, 2010). Anarchism aims to maximize both individual autonomy and collectivist freedom, leading to the reduction of fixed hierarchies that systematically privilege some people (species, things, etc.) over others. Self-determination is, perhaps, self-explanatory as a principle, at least in a cultural context that so values individualism (e.g. the United States); it is a freedom of choice in one's own acts, with no form of external compulsion. Collectivist freedom, distinct but not necessarily separable from individual freedom, is a freedom in which the individual finds their freedom through voluntary association with other members of society, not isolation from them. Bakunin (1971) argued that one is only truly free when among the equally free; "the freedom of each is therefore realizable in the equality of all" (p. 76). Concisely, to embrace any form of anarchism is to express profound skepticism toward skewed, coercive, and exploitative power relations, and to reject all forms of oppression, including those of class, race, gender identity, and religion (Lawler, 2019).

There are a variety of anarchist orientations, characterized by placing more weight on one rather than the other side of a polarization of freedom versus equality, often distinguished by individualist and social anarchists. Individualists place emphasis on the rational individual as morally and intellectually sovereign (Suissa, 2010). The social anarchist views individual freedom as conceptually connected with social equality, emphasizing community, cooperation, and mutual aid. "I am not myself free or human until or unless I recognize the freedom and humanity of all my fellow men [sic]" (Bakunin, in Suissa, 2010, p. 44). Given my presence in

cultural contexts that so often value individualist over socialist interpretations – a fascinatingly meta hierarchization – I aim instead to privilege the latter over the former.

In short, anarchism is the absence of hierarchy. It imagines a relationship among people that minimizes if not eliminates coercive structures and interactions, taking seriously the possibility of an equal and free society, organized on core values of *cooperation*, *mutual aid*, and *freedom from unjustified, coercive hierarchy*. Anarchism is an expression of love, a love brought into being through opposition to violence.

What is an Anarchist Theory of Action?

As anarchism is the absence of hierarchy, an anarchist theory of action actively opposes hierarchy. As I aim to foreground collective freedom over more individualist notions (itself a choice guided by the desire to oppose hierarchy), my anarchist theory of action consciously pushes to oppose hierarchies that might be said to constrain collectivist freedom. As I find myself situated in a particular intersectional context (graduate school, mathematics, social sciences, etc.), I will oppose what hierarchies I might be uniquely positioned to deconstruct. This, then, is what guides the inertia of my brushstrokes: Opposition to social hierarchy, opposition to the valuing of "rugged individualism" over collectivist freedom, and particular (but not sole) opposition to the hierarchies I might be best positioned to act upon. Concisely, I am guided by love enacted through opposition to violence, and particularly the violences I feel most empowered to oppose, as informed by the tenets of *cooperation*, *mutual aid*, and *freedom from unjustified, coercive hierarchy.*

A Portrait Viewed Up Close: Core Content

The core of this dissertation is comprised of my practice of anarchic activism over the course of the final years of my doctoral journey, and so the dissertation extends beyond the

written content of this document: It is my presentations which are designed incorporating aspects of my background in activist community organizing (Bowers & Lawler, 2021a, 2021b), my collaborative outreach initiatives (e.g. The Critical Philosophical & Psychoanalytic Institute for Mathematics Education, The Journal for Theoretical and Marginal Mathematics Education), my service contributions (mentorship rooted in the selfsame notions of anarchist community organizing), and so forth. Thus, though this written product will be the *final written product* of my doctoral journey, it is but one component of the larger dissertation act.

The written product itself is comprised of three articles, each distinct in audience and purpose but nonetheless thematically tied through grounding in my anarchist theory of action. Making use of the three article format avails several affordances particularly relevant to my theory of action, such as: The opportunity to speak with multiple audiences (opposing compartmentalization and hierarchization of audience), the opportunity push my writing in multiple direction contemporaneously (opposing compartmentalization and hierarchy of ethic/aesthetic), and the notable affordance of being offered multiple opportunities to attempt to differently embody (rather than simply speak of) my anarchist theory of action. Below, I outline the three specific articles comprising this dissertation. In the next section, I look across all three articles and discuss how they collectively embody my theory of action. With the encouragement of my advisor and committee, the form each writing takes in the dissertation will make minimal comprise towards publication, with the understanding that such compromises can be made later and I may never be more free (in terms of writing) than I am at this moment. “When we are ourselves linked tightly into the structures that influence our lives, it can be hard to distinguish what is genuinely impossible and what is impossible only within the current system (Pais, 2012;

Putnam & Borko, 2000)" (Bowers, 2018, p. 292); and so I will indulge in a moment of anarchic freedom as I begin tracing the possibility space for a lifetime of anarchic research and praxis.

Article –Examples, Exceptions, and Monster Barring

Educators who take seriously Freire's stance that "the educator has the duty of not being neutral" (Freire & Horton, 1990) may inevitably value change of some sort. After all, what could be more "neutral" than the unabating stasis of the status quo? Thus finding oneself taking on the role of the activist, the role of one who desires and acts towards change, one might inevitably reflect upon what social actions and mechanisms might result in a genuine and lasting change to current context and praxis (to be contrasted with pseudoaction, which we might think of as action and performance that nets only superficial or fleeting change, as explored by Žižek, 2006; Pais, 2012; and others).

In this article, I explore one potentially powerful tool for enacting change – namely, the power of example, and the limits of that power. In Cartesian/Kantian Rationalism, such as that which underlies disciplines such as mathematics and cognitive psychology (Piaget embraced Kant while rejecting Hegel), examples are extremely powerful. A single example can *prove* existence, and a single counterexample can *prove* nonexistence. In pedagogic practice, the development of conceptual understanding can be powerfully advanced through collections of examples (and non-examples), allowing one to construct a complex understanding of a topic or object even when formal definition seems impossible or out of reach (e.g. Battista 2012a-f). Socialization into these discourses might lead one to imagine that sharing or constructing example(s) might hold untold power in the work of the activist and the quest for social change.

While acknowledging the power of example in particular contexts, my main purpose is to challenge a culture that might lead one to overstate this power in broader social discourses, and

to explore some of the limits of the power of example. Drawing on work from teacher education (Corwin, 1989; Harkness & Thomas, 2008), social equity (Kendi, 2016; Sakai, 2014/1983), and philosophy of mathematics (Lakatos, 1976), I describe the important role *exception* plays in how people make sense of examples in social discourse spanning the gamut of the aforementioned areas of work. When an example is regarded as *monstrous* within one's extant system of belief and knowledge, it seems it is discarded as the exception. When might the generation or sharing of examples allow for substantive change, and when does the sharing of examples become pseudoactive (Žižek, 2006)? What roles might examples and exceptions play in teacher education?

To provide narrative structure to this exploration, I employ the form a Dialogue among four characters: A mathematician, a critical historian, a social activist, and a teacher educator. These four characters, as prompted by a question from one of their number, reflect on their experiences, their goals, and the role example plays in their work. Each of their number draws upon experiences synthesized from the recorded experiences of their non-fictional counterparts: The mathematician from the experiences of mathematicians (Lakatos, 1976), the critical historian from the experiences of critical historians (Kendi, 2016), the social activist from the experiences of social activists (Sakai, 2014/1983), and the teacher educator from the experiences of teacher educators (e.g. Corwin, 1989; Harkness & Thomas, 2008). The Dialogue itself will be not-quite-Socratic. Like a Socratic Dialogue, characters will express doubts, be attentive to each other, and work towards consensus. Unlike a Socratic Dialogue, I do not construct one of the speakers as a facilitator, nor do I proceed with the assumption that suppressing and veiling emotional entanglement is advantageous (Bowers, 2019c) – indeed, the poetry of the emotional

entanglements and motivations of the characters comprises part of what is to be explored, as well as part of what might draw in and hook prospective readers.

The form of the dialogue was chosen primarily as a means of dialectically exploring an area of inquiry where no precise answer is possible (Murphy & Katula, 2003): How can examples facilitate (or fail to facilitate) our efforts towards change? Along with this primary motivation, the form of dialogue also offers a chance to humanize the discussion by grounding it in human characters (whose experiences and thoughts are based in those of actual humans), as well as an opportunity to build my own skill as a writer through exploration of a form of writing I have not previously utilized.

Article –Methodocentrism in Mathematics Education

> Since the early nineteenth century, many in the Western world have dreamt of ordering life and reality around the certainty of facts, the predictability of the future, the stability of isolated phenomenon, the universalization of mathematical thinking, the necessity of hypothetical/deductive thinking. This is the Laplacean dream… For this Laplacean science, 'a description is objective to the extent which the observer is excluded and the description itself is made from a point lying de jure outside the world' (Prigogine & Stengers, 1984, p. 52). This view has led to the creation of experimental methods in the sciences which involve a reduction of 'natural' complexity in order to focus attention on measuring specific aspects, or variables, of a phenomenon. As a result, Western science becomes caught up in what we call 'methodocentrism': the belief that particular, pre-formed methods can guarantee the validity of an intellectual investigation into the world by factoring out the vicissitudes of the observer's entanglement with the world (see Said, 1979, pp. 9–10). To use a word that is crucial for Stengers's (1997) conception of science, *methodocentrism* is about trying to

> minimize the 'risk' of intellectual investigation, an avoidance that *ultimately produces bad science.* (Weaver & Snaza, 2017, pp. 1055-1056; emphasis added)

In the article quoted above, Weaver and Snaza (2017) critique methodocentrism, which they define as the belief that the predetermined method(ology) one chooses to guide research determines its validity, legitimacy, and trustworthiness. Their critique, grounded in science studies and posthumanism, argues that methodocentrism is deeply implicated in anthropocentric and colonialist politics. The argument I (will) put forth here diverges from Weaver and Snaza in two notable ways: (1) I further define methodocentrism to refer to and connote the normalization of quantitative and qualitative (e.g. AERA, 2006) methodologies to the exclusion of other research paradigms (AERA, 2009; Howe, 2009), and (2) I adopt a humanist rather than posthumanist stance in response to concerns that posthumanism can be recolonizing in how it potentially draws attention away from the ongoing humanist projects of social justice and equity (Gholson, 2019). My goal, then, is simply to make methodocentrism visible to an audience for whom it might have previously operated below the level of consciousness.

I previously shared an early version of this argument, as well as an early version of the argument that became my Comprehensive Exam Depth Paper, in the presentations and proceedings of the 41st annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (Bowers, 2019c). I wrote that earlier paper in response to my mounting unease over the ethical implications of certain norms of education research that I had previously taken for granted (norms that, frankly, I had never been prompted to question prior to entering doctoral study here at Michigan State University), and in so writing I aimed at least as much to give myself space to consider my own answers to these questions as I

aimed to convince anyone else towards any particular resolution to observed tension. That initial, short (roughly four page) manuscript was written with the assumption that I would continue thinking on those ideas and later expand each into a full manuscript, again at least as much for the sake of my own understanding as for anyone else. Having made use of the opportunity presented by Comprehensive Exams to expand the first of the two ideas, I now aim to expand the other.

Whereas the early version of these ideas comprised a chiaroscuro sketch of an argument, rooted in only one feature of how methodology shapes our thought and practice – namely, how it shapes selection and evaluation of research questions – this revised and expanded version of those ideas is intended to both further flesh out how methodology shapes research questions and to explore how methodocentrism shapes praxis across other aspects of the research process (e.g. "allowable" data, "reasonable" implications, perceived role of the voices of research subjects, "reliability" and "validity"). To accomplish my goal of making visible methodocentrism, I both elaborate in rough terms on what that center sometimes looks like, and (more importantly in my assessment) offer an articulation of anarchist methodology as a counterpoint from which to notice certain taken-for-granted features of the methodological status quo.

Article – Rhetorical Stasis

In pursuing a PhD in mathematics education, one must inevitably wrestle with the question of what role mathematics currently plays, could play, or should play in our field (and its various subcommunities). One must further wrestle with the question of how to convey, to those who affirm or deny expertise in our field, that one has attained expertise in mathematics or mathematics education. Even in my still early experiences as a researcher, I have been faced with the question "Where's the mathematics," deployed to question the presence of me or my work in

particular institutional spaces. In this third article, I aim to respond to pragmatics such as these by reflecting deeply on my own answer to that question.

This article wrestles with a topic I have wrestled with since my time as an undergraduate: What is my personal/professional relationship to mathematics? To explain give some sense of the tension(s) I am responding to, consider elements of my personal narrative, and particularly on my ongoing sense of the tension between *mathematics* and *equity*. In 2010, I graduated with a Bachelor's degree in mathematics – at this point in time, had the topic been broached, I would have generally agreed with others around me that mathematics was acultural, was a discipline uniquely immune to very real disparities between people of different backgrounds and positionings. Three years later, I had a Master's degree in STEM education and a few years of teaching under my belt – at this point in time, I would have agreed that mathematics was not immune to individual or structural forces of inequity, but I would have carefully foregrounded mathematics as my primary concern and equity as a secondary but always important concern. After another three years passed, I graduated with a Master's degree in mathematics, increasingly disillusioned by the harm I saw incurred by a discipline I loved but writing research papers rooted firmly in mathematics at the expense of equity (e.g. Bowers, 2016; Hajira, McNeal, & Bowers, 2016) – to be clear, I am not suggesting that equity necessarily comes at the expense of mathematics or vice-versa (I'm not convinced it does), but I would describe my personal work in these early publications and in my course papers at the time as valuing mathematics at the expense of equity. Within the next three years I was working on a PhD in Mathematics Education, and I had come to decide that equity was core to my principles and commitments.

At this point, I was beginning to find myself personally and repeatedly posed with the aforementioned question which has existed in discourse around equity in mathematics education for years (Battista, 2010; Confrey, 2010; Heid, 2010; Martin, Gholson, & Leonard, 2010): "Where's the mathematics?" Though some (much?) of what I was writing at this point was still inarguably of particular relevance to mathematics education (e.g. Bieda, Bowers, & Küchle , 2019; Bowers, 2019a; Bowers, 2019b; Bowers & Küchle, 2019), I was beginning to produce more and more writing where the import or impact of mathematics was, while not absent, potentially rendered invisible. When presenting the paper where I first posed my own challenges to rhetorical and methodological norms (Bowers, 2019c), I was approached by a grad student in the early years of their study and asked if I thought the submission was really "mathematics education" and why or why not (I observe that they were early in their program because I like to think they may have been experiencing a version of the tension I myself was beginning to work through, in sincerity, at that point in my own studies). In presenting my comprehensive exam depth paper, I was again asked "where's the mathematics?" Thus, if this is to be a trial I might face over and over again in the coming years, it seems particularly wise to begin the construction of a substantive answer now rather than later.

Thus, this article will explore the question of "Where's the math," as well as the refrain "both/and" commonly echoed regarding the math/equity tension, from the perspective of an anarchist mathematics educator. Drawing upon tools such as my anarchist theory of action, the bodies of work around decolonizing education (e.g. Patel, 2016), philosophy and culture of mathematics (e.g. D'Ambrosio, 1985; Ernest 1991, 2019; Lakatos, 1976), and the philosophy and culture of education (Bingham & Biesta, 2010; Suissa, 2010), I will construct and argue for one answer that might arise out of a valuing of both mathematics and equity while rooting

oneself in an anarchist theory of action. In so doing, I hope to move beyond a "both and" response (e.g. Confrey, 2010) by questioning the compartmentalization (Patel, 2016) that necessarily underlies such answer, as building compartmentalization into our answer may doom us to simply reproduce old violence in new form.

A Portrait Viewed from a Distance: Synthesizing the Narrative

In this section, I tie my dissertation as a wholistic product and process back to my theory of action: cooperation, mutual aid, and freedom from unjustified, coercive hierarchy (with particular opposition to the hierarchies I might be best positioned to act upon). To reiterate concisely, I am guided by love enacted through opposition to violence, and particularly the violences I feel most empowered to oppose. Here, I focus on expressions of anarchism that consciously guided my developing ideas as I imagined what my dissertation might contain, and as it began to take form.

Cooperation and Mutual Aid

Taken together, these two central ethical tenets of anarchism convey a straightforward idea: We work together, and we work together for the benefit of all. In my dissertation, these tenets have manifested primarily as various forms of community organizing and discourse shaping. Taken as a whole, my dissertation (product and performance) acts to shape political discourse in our field as well as acting as a type of direct organizing/outreach. In particular, the following acts were reflections of these ethical tenets:

- All three articles (and especially article 1) represent calls to action. They are individually and collectively meant to unsettle centrism, and motivate other researchers/pedagogues to take an active stance against the status quo.

- All three articles (and especially article 1) push boundaries in terms of both content and form, trying to normalize and make space for comrades to engage in yet more revolutionary work.
- I have one completed and one scheduled conference presentation for sharing components of this work (especially related to article 2), sharing the intentions listed above.
- In collaboration with others (community organizing), I have helped to launch a new institute and journal, with the explicit goals of making space for marginalized research in mathematics education. Article 1 is under review to potentially appear in the first issue.
- Through reflecting on the tensions motivating my dissertation, I can now more comfortably/confidently express my own relationship with research, both for my own benefit and for the benefit of peers/mentees experiencing similar tensions.
- I have pursued several opportunities to mentor (e.g. Writing Fellow in the Disciplines), incorporating my anarchist identity throughout as an emancipatory force (e.g. "You are more free than you realize")

Freedom from Unjustified, Coercive Hierarchy

Unjustified, coercive hierarchies include those of race, class, gender/sexuality, dis/ability, and so forth, as well as the more "localized" hierarchies one might encounter in any culture of practice (e.g. established vs. emerging scholars, the sciences vs. the humanities). Taken as a whole, my dissertation (product and performance) acts to oppose such hierarchies in our field. In particular, the following acts were reflections of this ethical tenet:

- Article 1 aims to unsettle a certain centrist comfort that can accompany privilege, with the goal of motivating allyship as well as solidarity amongst those of divergent marginalizations.

- Article 2 aims to unsettle taken-for-granted methodological norms which act to marginalize queer, indigenous, and other marginalized work.
- Article 3 aims to unsettle taken-for-granted rhetorical moves which act to marginalize equity work as a whole within our field.
- The newly launched institute and journal are meant to make space for research with content/form historically marginalized in our field.

To briefly recapitulate, through my theory of action I am guided by love enacted through opposition to violence, and particularly the violences I feel most empowered to oppose. Rooting my thought and choice in this theory of action, I have constructed a dissertation which enacts and embodies my personal anarchism, albeit in tension (sometimes keen tension) with my sense of the pragmatics of the space(s) I currently occupy professionally. As established in the preface, I do not aim to simply prescribe what *Anarchist Mathematics Education* is or should be – instead, I aim to embody my personal sense of what it might mean to be an anarchist mathematics educator.

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CHAPTER 2: EXAMPLES, EXCEPTIONS, AND MONSTER BARRING: UNSETTLING CENTRISM IN MATHEMATICS EDUCATION

**Note: Socratic dialogue (also referred to as Platonic dialogue) is a discursive/pedagogical technique which is used to explore questions with no clear answer, typically with a focus on surfacing inconsistencies in the learner's thinking. I share those purposes and goals, and therefore am making use of many aspects of Socratic dialogue in this article. However, in two respects I will diverge from the common image thereof. First, Socratic dialogues typically frame exactly one speaker as the pedagogue or authority figure. However, for my goals, this is problematically reductive. It is my experience that all speakers bring unique perspective and information to the conversation, and I aim to reflect that in what I have written here – all are teachers, all are learners. Second, Socratic dialogues commonly limit themselves to the purely logical components of an argument (to the extent that we might ever consider our emotional reality separable from the wholistic reality we occupy). However, for my goals, this is again problematically reductive. The problems and questions I explore here are deeply human ones, and dehumanizing the characters comprising my play would necessarily act against that goal. Thus, within the confines of my abilities, I aim to make the characters having the discussion feel like real people – I want readers to sense hidden depths within them that even I, the author, do not have access to. Beyond perceiving humanization to be an important ethical goal in-of-itself, incorporating subjective space to which we have no access is important so as to help us keep keenly in mind that reality is and will forever be more complex than any theoretical model or research methodology can ever hope to account for. No amount of inquiry will free us of uncertainty, and that is perhaps as beautiful as it is terrifying*

They walk on, as quick as one can while performing that casual strut, saunter, or swagger many of us sometimes employ when leaving difficult encounters – that nonverbal communication that we aren't hurt in any meaningful way, that our antagonists' hold no power over us. Like so many performances, it is at once a truth and a lie. T(eacher educator) holds his body tight, muscles clenched and drawn inward, eyes cast towards some sight or memory that is for his eyes only. C(ritical historian) is practically vibrating, both from keen anxiety after the experience and from thoughtfulness, cast as she was into her usual spiral of glorious wonderings and musings. M(athematicians)'s passions are turned more outward than inward – his shoulders pulled broad like he's trying to make himself look larger than he is, he gesticulates wildly as he articulates his rage following their shared experience.

M: What the fuck was that nonsense! I need a moment to cool down. Y'all wanna duck in this dive bar and have a quiet drink before we trek on?

T: *Muscles relax slightly, he takes a deep breath and lifts his eyes.* You know what? Yeah. I could use that.

C: *Nods.* A moment of peace is always nice, but particularly welcome at the moment.

They enter. As their eyes adjust to the dim light, they see only a few others, sitting at tables or the bar. Wordlessly, C and T seat themselves in a quiet corner while M grabs drinks.

C: *After wedging herself as far into the corner of the room as she can, C lifts her eyes*. I know, 'hashtag not all cops' or whatever, but that was just so typical and I'm just so tired.

T: *Nodding*. I've been tired a long time. I'm tired of being tired.

M: *Returning with drinks*. I know some of our pals are fond of the phrase "all cops are bastards," and that one sure as hell was, but I sure as hell hope they were the exception to the rule in this city.

T: *Shrugs*. I don't know… At this point in my life, I don't have a lot of trust leftover for the idea of "exceptions," let alone when I'm talking about police.

C: *Nodding*. It's definitely systemic.

M: Yeah, I guess it might be the good cops that are the exception, at least round here.

T: *Head shaking*. It's definitely systemic, but that's not really what I mean. Examples and exceptions seem like they should be straightforward, but the way people actually use them is… troublesome. Not epistemically or anything… well, maybe that too, but what I mean is a little different. Here, let me give you an example. You all know I work in teacher education, so let me tell you about a problem I keep running into…

Most of the preservice teachers I work with are aiming to teach young kids. These soon-to-be teachers come into my class with all kinds of preconceptions, some helpful and many not. For me, one of the most common and frustrating preconceptions they bring to my class is a view that young kids aren't smart or inquisitive. Like, in all my time working with young kids, they always find new and surprising ways to show me how clever and curious they are, but most of these preservice teachers don't know that 'cause they've bought into a cultural narrative that at every turn discounts knowledge in youth.

It's a big deal, because this is the kind of belief that can really shape how they engage with kids… I see it shape both what kids can learn from a teacher and what that same teacher can learn from or about their kids. One way teacher educators, including me, try to respond to this is with examples or cases that show off how smart kids are. One go-to example I've seen is an article called "Multiplication as original sin." (Corwin, 1989) In this article, a researcher reflects on an experience they had as an elementary student where they derived their own completely

valid method of multiplication, only to be chastised and publicly embarrassed by the teacher's response.

One thing I love about this article is how many of my preservice teachers can see themselves as that student. I get impassioned responses from my preservice teachers, and they seem really invested in how important it is to take the cleverness of kids seriously. It all seems good… but then I notice something, something also observed in later research that made use of that case (Harkness & Thomas, 2008). The preservice teachers describe the kid using superlatives: Gifted, extraordinary, amazing… We had this great conversation where I thought my preservice teachers were considering an example of how smart kids are, but instead they were considering the case of that one clever kid in a room full of normies. We were looking at the same thing, but I was talking about an example while they were talking about an exception.

C: *Head cocked sideways, listening.* Ahhhh. I think I hear what you're saying. There's this slippy slidiness to examples and exceptions. There's some kind of dominant narrative, and the case you were trying to share as a counterexample got brushed aside as an exception.

M: *Eyes bright.* Well, not to put too fine a point on it, but that's frustrating as hell. I know one of the reasons I initially picked mathematics is just 'cause I got tired of bickering semantics with teachers who were closed off to other reads of situations. Remember when Ms. Weekly gave me that D on that paper where I defended Hester Prynne in the Scarlet Letter? At least in math class when the teacher made a false claim I could give a counterexample and feel confident that it'd be treated seriously.

T: *Nods*

C: *Sipping drink, eyes cast into the distance.* It shows up in historic narratives too. Like, consider antiracist activism in this country. One recurring strategy people have attempted is something Kendi (2016) called uplift suasion, a strategy he typefied with the case of WEB DuBois. Y'all know the story?

T: *Nods*

M: *Cringes.* Embarrassingly, no… I'd love to hear more. Queue up your story – I'll see if the bartender can swing by to get us refills.

C: *Nods.* Kendi tells a longer and much more detailed version of the story, but in broad strokes it goes something like this.

Du Bois believed, like many abolitionists before him and many reformers to this day, that racism could be persuaded away through the presentation of facts. He imagined this pursued through many avenues: Scientists could discover facts. Educators could teach the facts. Laywers could present the facts in court. Fictional portrayals of black folk could present them in all their depth, humanity, and kindness. At marches and rallies, black folk could articulate the facts of their suffering. For his part, WEB Du Bois pursued many of these, but notably tried to contribute to the abolitionist movement through his mere existence… He was, in a word, exemplary, and through the sheer force of his existence he sought to demonstrate that black folk were no lesser than white folk.

Du Bois graduated from Harvard, he studied abroad in Europe, he taught at the college level… he was a prolific author, speaker, sociologist, and historian… He excelled at the highest levels of the white system he found himself born into. Du Bois sought to be a counterexample to the wholly negative white narrative of blackness, an example of how amazing black people could be

within the standards of a system that he did not always question, perhaps most notably when race intersected with class or gender.

In the end, though, he was always written off as an exception, as an exceptional black person… or more specifically as an exceptional black, white collar male. By the time he was in his late 50's, he wrote that "for the last two decades, [black folk] have striven by book and periodical, by speech and appeal, by various dramatic methods of agitation, to put the essential facts before the American people. Today, there can be no doubt that Americans know the facts, and yet they remain for the most part indifferent and unmoved." Uplift and persuasion had failed… He and his white audience were looking at the same examples, but his white audience was seeing exceptions, even in the case of Du Bois in of himself.

M: *Eyes bright.* Intense.

Bartender: *Pouring drinks.* Yeah, Kendi came down hard on uplift suasion as a strategy, and I really felt for that. I'm a political organizer and agitator here locally, and we have to go out of our way to educate people about this… Not all people, mind, but the more privileged their positioning the more likely we'll need to have lots of discussions about this before we can get them more active in our political organizing. Just proving that you can succeed in the system doesn't help when what we're trying to communicate is that the system is violent. Y'all need anything else right now?

M: I mean, that sounds cool as hell, and I kind of want to pick your brain more… Patrons over there look like they're waving you down, but if you wanna come back and chat afterwards, I'd love to hear more about how this kind of thing plays out in what you do. This whole conversation has got me thinking.

C: *Eyes focused, head cocked.* Yes, I'd love to hear more too.

T: *Smiles.* Yeah, please swing back by. In the meantime, I really want to grill M here about how he apparently dodged this problem… for his job, at any rate.

Bartender: *Nods assent, leaves.*

M: *Laughs.* You know, I meant what I said earlier about why I picked math, but the more I listen to y'all and the more I think about what math is like as a job instead of what it was like as a student, the more I think I didn't dodge anything.

T: *Laughs.* I have no idea what you mean… Are mathematicians so stuck up they won't accept your counterexamples?

C: *Laughs.* I wouldn't put it past them, but maybe that's my bad experiences in undergraduate mathematics talking.

M: *Smiles.* I know it sounds ridiculous, but when you get out of the area of sanctioned and agreed-upon knowledge in math, things change. As a student, and even as an undergraduate math major, all the math problems we did were already in the domain of "sanctioned" knowledge… A lot of reproving stuff we already "know", so to speak. But now what I do is different than what I did then… I'm trying to learn brand new stuff, and the way mathematicians talk around and about new stuff is just… different. Not in a bad way, understand, but definitely in a way that isn't reflected in the usual math student experience. Let me tell a story to try to show what I mean. One of you got a pen? I think I need to draw a picture.

T: *Smiles.* You've never been able to tell a story without drawing a picture, and there's something reassuring about seeing that math definitely hasn't changed that about you.

C: *Laughs, handing M a pen.*

M: *Laughs, takes pen and a napkin*. Trying to describe my work in abstract topologic spaces is probably more than y'all want to hear, but I think I got a better story. This is a story told by Lakatos (1976) in greater detail, but I'll try to keep it short. Let's talk about polyhedrons… please contain your excitement.

Laughter

So, y'all know what polygons are… We've got triangles, quadrilaterals, pentagons, and so forth… and each polygon has edges and vertices: Triangles got three of each, quadrilaterals have four of each, and so on.

Figure 1: Four examples of polygons

What we're looking at, though, are polyhedrons. These are basically three-dimensional polygons. A square is a polygon, and a cube is a polyhedron… a triangle is a polygon, and a pyramid is a polyhedron. Each polyhedron has vertices and edges just like a polygon, but they also have faces. This triangular pyramid has 4 vertices, 6 edges, and 4 faces… this cube has 8 vertices, 12 edges, and 6 faces.

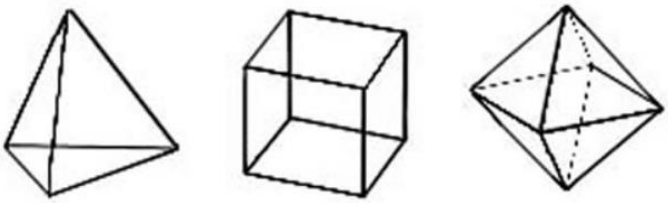

Figure 2: Three examples of polyhedra

It was pretty obvious right away that in polygons, the number of sides is always equal to the number of corners… that is to say, the number of edges always equals the number of vertices.

However, even up through the early 1700's, it was not obvious to European mathematicians what the equivalent relationship might be in polyhedra, or even if such an analogue existed. Enter Euler with a claim: V – E + F = 2. Vertices, minus edges, plus faces, equals two. If you have the insane urge, you can check it with the triangular pyramid and cube.

The "proof" is super cool and I want desperately to share it… I am a mathematician, after all… but it's really not the point. Euler shared his ideas, and mathematicians bickered, as we are wont to do. Enter the Kepler-Poinsot star polyhedron.

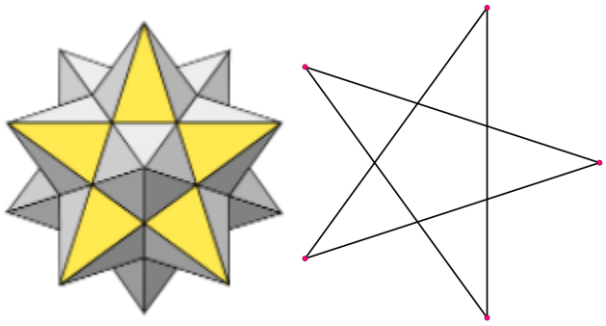

Figure 3: The Kepler-Poinsot star polyhedron and its polygonal cross-section

A triangular pyramid consists of 4 triangular faces. A cube consists of 6 square faces. This star polyhedron consists of 12 star pentagonal faces. Intriguingly, it also has 12 vertices and 30 edges, which means that for this polyhedron V – E + F = -6.

Other mathematicians responded in a variety of ways, but I want to surface one response in particular, something Lakatos called "monster barring." Basically, for some mathematicians, this did not count as a counterexample… it was an exception. Since it was an exception, they made rhetorical moves to bar its entrance as a problematic example. Maybe y'all can probably already guess the easiest way to do that… The star pentagon intersects itself, so you can just demand that a 3d shape made of polygons only counts as a polyhedron if its polygonal faces don't self-intersect.

C: *Head cocked sideways, eyes closed.* Interesting. I feel like I shouldn't be surprised, but I kind of am.

T: *Nodding.* We're all people, and all our practice is the practice of people. That nebulous, interstitial space between people and each other, or between people and the world… it's always there. Like C said, there's a slip-slidiness to examples and exceptions… an interstitial space of fluid meaning navigated by well intentioned people who remain nonetheless human.

C: *Lifts eyes.* And as we sail that see, the inertia of the tacit and explicit societal lessons we've learned cast a wind that draw us back toward hegemony.

M: *Smiles, rolls eyes.* Y'all've always made me look bad with your casual poetry. I'm definitely hearing that "winds of society" thing, though – it fits with the pattern I'm hearing in these stories. In T's story, the prevailing narrative is that children and receivers of knowledge, not it's generators, and so the wind drew some of your preservice teachers to perceive that cleverness as exception. In C's retelling of Kendi's story of WEB Du Boise, the prevailing narrative was one of black deficit, and so the wind drew white members of society to perceive his success as an exception.

T: Not just white members. Those winds are carried to us all, and when they assail our being they become an omnipresent violence.

M: Damn, yeah. Even in my math story… Euler, the guy who proposed the original polyhedral formula, is a big deal. Like, a BIG deal. His word carried weight, and so even if his conception of polyhedral hadn't been a dominant narrative before, in his wake it most certainly became one… and then counterexamples became exceptions.

C: *Nods.* To try to phrase it in math-like terms, we have a thesis statement along these lines: If a marginalized group or marginalized narrative does or expresses something positive, it is rendered as an exception.

T: *Nods*. Yup, that seems about right.

M: *Eyes widen.* Oh man, that's fucked up… I can't believe I didn't see it right away. Whenever I start introducing folk to formalized logic, one of the first hurdles I often see them encounter shows up when we talk about the "contrapositive" of a statement. For a statement "If P then Q," the contrapositive is "If NOT Q then NOT P." In raw logical terms, these are identical statements, but for lots of folk that's really hard to see. "If I am dirty, then I need a shower," in raw logical terms, has the same meaning as "If I don't need a shower then I am not dirty."

C: *Head cocked.* Interesting… how's that translate here?

M: The contrapositive of our thesis is "If a marginalized group or narrative does or expresses something negative, then it isn't an exception."

T: *Laughs with exasperation.* So, in more casual terms, the thesis is "If marginalized then bad." Damn, that's painfully on point in terms of societal perceptions.

C: *Shakes head.* Frustrating. Nor surprising, I guess, but baffling nonetheless. But then what about police? Police represent a dominant group and a dominant narrative, so while talking about examples and exceptions or good and bad police is still probably gonna be slippy slidy, it will undoubtedly slip in different ways.

T: *Raises eyes to bartender*. You catch enough of that? What do you think?

Bartender: *Smiling gently.* Yeah, I think so, and I do have an answer, though I think it won't surprise you. There are a million contemporary and historical stories I could tell to set this up: Police officers caught in acts of cruelty, Hollywood producers and directors accused of sexual

abuse, adults taking advantage of children, doctors dismissing the concerns of patients… In each of these stories, some version of the "bad apples" framing emerges, the same framing that, if the snippets of conversation I've overheard don't mislead me, brought you into this bar today. Oh, how our society longs to critique individuals with no attention to the systems that shaped them, gave them direction, and literally or metaphorically armed them. Those tales are powerful, but they also inundate our news feeds… you don't need me to point them out. Instead, I'm going to tell you a less intense story, but one which had a lasting impact on me by virtue of its apparent lack of intensity – it was not shocking situation, just life-as-usual. Here's a short-version of my first experiences as an active union member, an experience I later discovered echoed the history of where I grew up (Sakai, 2014/1983).

In my hometown, in rural Appalachia, the company I worked for after High School was fairly big and when I joined it didn't have a union. Many employees were unconcerned… It hadn't escaped their attention that their bosses were taking home more money than they were, or otherwise benefitting from the system in ways that they didn't, but their bosses mostly left them to their own devices, aside from the occasional and expected display of authority, and their wages were at least above the poverty line – something not everyone in my hometown could say. I would say my coworkers wanted more, sure, but the status quo was not so uncomfortable to drive them to fight for it.

This comfort, such as it was, did not apply to equally to everyone. People of color, queer people, women and trans people, neurodivergent and disabled people, those who had any history in sex work, those with any history of drug addiction… even people who simply didn't attend Christian worship were subject to extra scrutiny, to abuse from those in power, and to exclusion by peer

groups whensoever the eye of power was cast too intently upon them. The more intersectionally marginalized we were, the more intolerable the status quo was.

Unionization was often spoken of, though always in quiet, furtive ways. Eventually, amongst those who found the status quo intolerable, some of us were able to build enough momentum to begin trying to unionize. We met in secret, hiding in the bushes metaphorically and sometimes literally. The most privileged of our coworkers stayed well clear, afraid as they were of losing out on the good thing they felt they had going. However, over the course of a few months, we picked up lots of support and membership from our marginalized colleagues. We had big plans: We drafted contractual language to protect our marginalized peers, we examined budgets from our company and similar companies as well as productivity research to craft compelling arguments for more pay and personal time. We drafted a complete overhaul to what our workplace could look like. We formalized our union and began organizing around our demands. We began pointing to the systemic violence of our workplace, proposing our carefully crafted alternatives, and we had grown enough in support that the company had to respond – sometimes they were even driven to acquiesce to our calls for a better work environment.

Noticing our growing successes, our privileged peers began showing great interest in our union. Over the course of a few months, they began joining en masse. Inevitably, we reached a point where the relatively privileged outnumbered the intersectionally marginalized, and soon most of our elected positions were filled with the former while those of us who had begun the union were driven back to the margins. We quickly saw our carefully researched proposals gutted. The systemic problems we surfaced? New union leadership saw those as exceptions to the norm, as they certainly had no experiences of the kind. Coworkers experiencing abuse? Exceptions to the norm. Abusive floor managers? Bad apples. “Sometimes bad things happen… you can’t always

point the blame at the company." We wanted change, real change, but our privileged coworkers felt that was too much to ask, for if we ask for too much, then why would the company give us anything? All we saw from that point until I left the company was a string of purely symbolic olive branches, extended not for my benefit, not to appease me, but to appease my privileged coworkers. Sure, they'd fight for us when the violence we were experiencing was obvious to them, but if they could find some sort of angle where it looked like our concerns were being considered, then that was "good enough," and "all that could be expected."

T: *Nodding*. Yeah, that sounds about right. Makes me think of how Leftists actually *were* and *are* calling for police abolition, but when the movement recently got inundated with those privileged enough to have avoided the fear of extrajudicial killing the language quickly softened to *defund*.

Bartender: *Nodding*. Often with the added language of "No one is suggesting total abolition…" as if I'm not standing right here, asking for literally that.

T: *Laughs*. Exactly.

C: *Eyes staring into the middle distance*. Well, I guess we have our second thesis. If a privileged group or privileged narrative does or expresses something negative, it is rendered as an exception.

M: *Grimaces, laughs awkwardly*. Contrapositive: "If a privileged group or narrative does or expresses something positive, then it isn't an exception." Basically, if privileged, then good. Fucking figures.

T: *Nodding*. I guess this highlights what I meant when I said I don't trust examples and exceptions… We all internalize our society in greater or lesser part, and part of that

internalization is “privileged good, marginalized bad,” so speaking and thinking in terms of examples and exceptions might incline us to support a violent society rather than tear down a system of violence.

M: *Turns towards bartender.* This has got me thinking back to what started my friends and I down that conversation, the language of “All cops are bastards.” When I hear or see people talk about this in conversation or in social media or whatever, they end up talking about examples and exceptions, but that seems like an unhelpful track. What’s your take on the language of ACAB?

Bartender: *Smiling*. Honestly, I get how it makes some people deeply uncomfortable, but that’s kind of the point… It can be important to sit with your discomfort, especially if your privileged enough that you can choose to avoid or ignore it. That discomfort is telling you something, something you need to hear.

The language of ACAB, in my view, does at least two things. First, it’s a systems-level critique that doesn’t use systems-level language… That’s a big deal for a political organizer who critiques systems, because systems-level language can be cumbersome and unapproachable even to someone with experience using that kind of language – political organizing demands accessible language. Second, it acknowledges *complicity* with the system. Again, I grew up in a small town in Appalachia, so I *knew and had gone to school with* many of our local police officers. Some of them were good friends of mine, people I would describe as good people. However, Policing is a system of violence, and ACAB expresses that complicity. I use it in other contexts too… My coworkers regularly hear me say “All managers are bastards” in spite of the fact that my job here is basically management. Using that language recognizes my own complicity, gives me a discomfort that I think it is important to sit with.

T: *Nodding*. I hear that.

C: *Eyes raised, head cocked, staring intently*. If I might ask a silly question, why is that discomfort so important to you?

Bartender: From my time in that union… We move within and against systems in a different way when we think we can be good *within* the system than we do when we acknowledge that we can never truly be good until we tear the system down. Plus, as soon as we ended up surrounded by the comfortable, those of us who were uncomfortable felt so… gaslit? Like, if so many were apparently so comfortable, then how could our pain be real? I wonder, if my coworkers sat with their discomfort, how things might have been different.

C: *Nodding*. Interesting. Reflecting on my authority, and the role research and academia have played in colonization and systemic violence, I wonder if All Researchers Are Bastards too?

M: *Laughing.* Damn straight we are!

T: *Chuckles.* The districts and universities I've worked for weren't ever angelic, either. I had a lot of bad experiences with teachers as a kid, and I think that kinda drove me to where I am today, but frankly *Teachers* with a capital T still make me uncomfortable. I wonder if the same should be said of our role as teachers?

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CHAPTER 3: METHODOCENTRISM IN MATHEMATICS EDUCATION: ESCAPING ITS SHADOW AND WAKE

> *Violence is all around us. Yet we prefer to remain asleep-the walking dead. For me personally, the more that I become aware of the magnitude of violence in our world, what many of us would rather deny or not see, the more I enter into that space of the "dark night of the soul," a place where dread and hopelessness reside. The objective though, is to continue to remain awake, to keep fighting for a better world even as one endures the dark night of the soul.* (Evans & Yancy, 2016)

Research in mathematics education is methodocentric. By this, I both mean that there are a tightly constrained collection of methodologies constructed as acceptable, laudable, and commendable (Bowers, 2019c); and also that these underlay and interrelate with a broader belief that particular, pre-formed methods allow us to seek "truths" that would otherwise elude us, as through the factoring out of the vicissitudes of the observers entanglement with the world (Weaver & Snaza, 2017). We live in these walls of our own creation, and for some it is as a fortress while for others it is a cage.

The roving fortress of methodocentrism is a force of violence. It is part and parcel to the systems of oppression animating it (e.g. abled, cis-hetero patriarchal, white supremacist Capitalism). "The same capitalist system that needs social exclusion to reproduce itself stimulates the frenetic production of research aimed to eliminate such exclusion," (Pais, 2012, p. 83) and so those of us engaged in the work of teaching or educational research are constantly faced with the reality of the innumerable bodies consumed by the systems we reify (Martin, Price, & Moore, 2019), as well as the discarded remnants left summarily in our wake.

Despite the omnipresence of methodocentrism in our work, consciously observing it is shockingly difficult, especially for those most closely aligned with its cultural center–as with any ethnocentrism, one cannot escape the relevance of the commonplace cultural anthropology metaphor of the fish being the last to notice the water–and with that difficulty in mind, the purpose of this paper is primarily to make methodocentrism visible (while also providing those already well-familiar with an opportunity to imagine one particular world outside the centrist imagination). My means for doing this is straightforward, but not necessarily easy or comfortable. In our oceanic analogy, the fish is surrounded, inundated by water… water is a given, a default, as aesthetically natural as breathing, and just as likely to operate below the level of consciousness. By the same token, the methodocentric norms embedded and reified in the system(s) we occupy are performed as natural, as a default, as breathing. But what of the fish if you were to raise it over the ocean surface? Suddenly, the ocean water is drawn into sharp relief–even if the fish does not immediately process the source of its distress, that distress still acts for the fish as a pointer towards something worth noticing. Thus, the primary means by which I aim to illustrate methodocentrism is to draw you into a perspective outside of the water, a perspective which might generate emotional responses that readers might use to draw their attention to certain tacit aspects of their own practice or belief (Wheatley, 2005). In particular, I aim to leverage my own background and expertise in anarchism (Bowers & Lawler, 2021a, 2021b) to draw you into a perspective well outside the neoliberal and neoconservative center(s) of education (Apple, 1999; McGregor, 2009) as well as outside of the static binarism ubiquitously interwoven therein (Moore, 2020).

In pursuit of this purpose, I organize the remainder of this manuscript as follows: (1) I articulate the conceptualization of methodology that I will use as framing and guide, while

surfacing examples from the methodological center; (2) I lay the theoretical foundation for anarchism as methodological frame; (3) I outline what practice based in anarchist worldview can and might look like; before finally (4) anticipating and exploring some of the tensions that someone at the cultural center might feel in engaging with my anarchic perspective.

Defining Methodology and Establishing Foundations: Methodology and Worldview

> In the end, considerations of ontology, epistemology, ethics, values, subjective and ideological grounds, and so on—that is, the researcher's worldview—should precede not follow theoretical and methodological considerations. Explicitly and critically interrogating one's worldview should be the starting point of any research project. (Stinson, 2020, p. 13)

> We also noted that students and scholars (often of European descent), on hearing us present our work, would ask how our methodology differed from theirs. In response, we asked them to articulate exactly which aspects of standard quantitative methodologies they wanted us to contrast Indigenous methodology with… What intrigued us about such questioning was not that our audience wanted to know how an Indigenous quantitative methodology differed from other methodologies, but that they wanted us to provide a coherent picture of our methodologies when they could not provide a coherent picture of theirs. (Walter & Andersen, 2013, p. 43)

In this section, I surface and explore some of the methodological assumptions core to both traditional and anarchist research. Given the broad understanding within and adjacent to the mathematics education research community that many early- and even late-career scholars have (in some respects) an emerging understanding of methodology (Stinson, 2020; Walter &

Andersen, 2013), I begin by outlining what methodology is in general and surfacing some examples of qualities common to our fields methodological center, particularly qualities which will be revisited in subsequent sections of this paper as points of departure for anarchist methodology, before then articulating the methodological foundation (worldview) of an anarchist researcher. The goal is to adopt/envision anarchism as a position outside of the methodological center from which we can look back upon that which is often taken for granted, both through direct observation and through critical reflection around the emotional tensions we may experience (Wheatley, 2005); this section lays the foundation for us to do so by outlining aspects of traditional and anarchist worldview in the context of methodological assumptions.

To frame this chiaroscuro sketch of methodology, I employ the framework of Walter and Andersen (2013), visually represented in Figure 1. In brief, methodology as a whole is comprised of a relationship between *researcher worldviews* (e.g. what are the goals and purposes of research, what makes research convincing or worthwhile, what means might help us make sense of the world) and *research methods* (the specific actions we take when doing research), with that relationship typically mediated by a theoretical frame (an explicit statement of theoretical assumptions). Methodology is the vast web made up of who we are, what we are doing, and the connections and tensions between those two things. For our purposes, it is worth noting that methodologies can be coherent or incoherent–our worldview can lead to our methods (coherence), or our worldview can be in conflict with our methods (incoherence; imagine, for example, moments of tension in your work that you may have alleviated with a thought such as "…but this is just a job").

Thus, in making sense of methodology, our task can be reflectively understood as one of surfacing aspects of our worldview, surfacing explicit and tacit aspects of our methods, then

critically reflecting on how those two spaces are (dis)connected. Worldviews are complicated, multifaceted, often internally contradictory, and commonly exist below the level of conscious thought. To guide our consideration of worldview, Walter and Andersen (2013) point towards four key areas of consideration: ontology (philosophy of being), epistemology (philosophy of knowing), axiology (philosophy of ethical and aesthetic value), and social position. Here, I will elaborate on these four areas and surface a few commonplace characteristics of our field's methodological center, which will serve both as (hopefully) recognizable elements of each category and as worthwhile points of departure later. It is worth noting that while Ontology and especially Epistemology are regularly consciously/explicitly accounted for in the construction of theoretical frames (and more generally in mediating worldview and method, even where no theoretical frame is explicitly mentioned), Axiology and Social Position are prone to being left tacit (e.g. Biddle & Schafft, 2015). Furthermore, note that each of the four categories are deeply

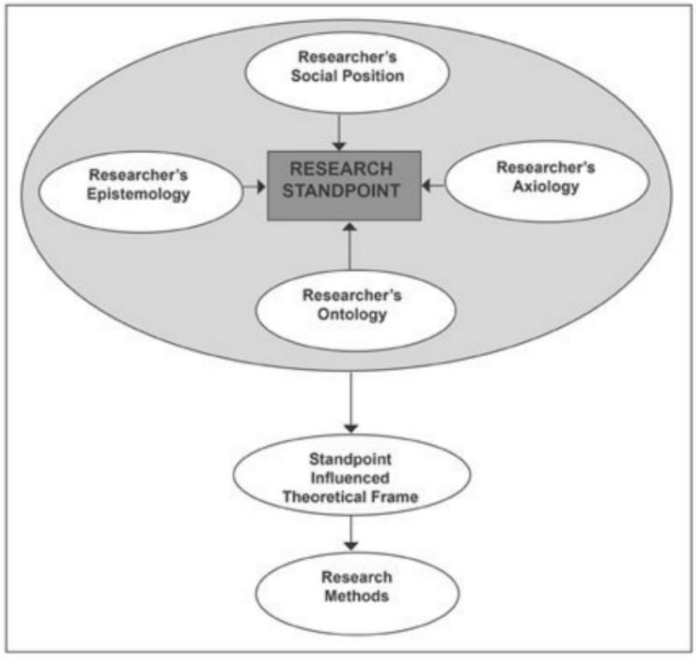

Figure 4: Conceptualization of Methodology (Walter & Andersen, 2013, p. 45)

interrelated and can't be meaningfully separated (in spite of my pragmatic choice for constructing this manuscript), and I will surface a few of these connections as we go.

Ontology

Ontology, the philosophy of being, deals with how we perceive and operationalize a notion of reality. Far from concrete or immutable, our sense of what is *real* and how we respond to that *reality* can be fluid and even contradictory. Ontology establishes invisible boundaries around what is considered possible or meaningful, made visible in the ongoing clash between marginalized ontologies (e.g. indigenous, diasporic, queered) and governing societal understandings (Walter & Andersen, 2013).

Despite the impossibly large array of possible ontologies, "ontology tends to merit little discussion in research methodology debates, especially those of quantitative methodology." (p. 52) This might be reasonably ascribed to historical context: In many research spaces, positivist framing and its analogues have been discarded but not replaced (Walter & Andersen, 2013), leaving static—white noise (pun intended). Thus, there is a certain kind of mostly unquestioned ontological realism typically taken as a default or point of departure (that is to say, a component of our fields methodological center), comprised of beliefs such as (Jenkins, 2010): (1) There are facts of the matter about ontology, which are objective; (2) ontological disputes are serious, in that they are neither trivially easy to solve nor merely rhetorical; and (3) EITHER the meaning of relevant existential quantifiers is not sensitive (except in mundane ways) to the context of utterance OR even if it is so sensitive, there is exactly one *best* candidate meaning for the existential quantifier that is of especial relevance to ontology. In other words, it is common to believe (1) that there exist unquestionable ontological *facts*, (2) that ontological disagreements are serious (and, by proxy, other ontologies are flawed), and (3) that "facts" exist in some way

independent of how we think, talk, experience, conceptualize, and so forth. The primacy of these beliefs is sufficient that in cases where I or my peers have discussed ontology, epistemology, and axiology, tensions immediately manifest from some readers/discussants when *ontology* is not listed first.

Relevant to mathematics education in particular, I note that similarities exist between *ontological realism* as default and with commonplace views of mathematics itself (Greer & Mukhopadhyay, 2012). In describing *The Romance of Mathematics*, a commonplace cultural narrative they persistently encountered in their studies of mathematicians and other users of mathematics, Lakoff and Núñez (2000) mention seven characteristic beliefs associated with The Romance, four of which reflect this ontological realism as applied to disciplinary mathematics (pp. 339-340):

- Mathematics is an objective feature of the universe; mathematical objects are real; mathematical truth is universal, absolute, and certain.
- What human beings believe about mathematics therefore has no effect on what mathematics really is. Mathematics would be the same even if there were no human beings, or beings of any sort. Though mathematics is abstract and disembodied, it is real.
- Mathematicians are the ultimate scientists, discovering absolute truths not just about this physical universe but about any possible universe.
- The mathematics of physics resides *in* physical phenomena themselves–there are ellipses in the elliptical orbits of the planets, fractals in the fractal shapes of leaves and branches, logarithms in the logarithmic spirals of snails. This means that "the book of nature is written in mathematics," which implies that the language of mathematics is the language of nature and that only those who know mathematics can truly understand nature.

This suggests that ontological realism could have a unique hold on (or at least a unique relationship to) the methodological center of mathematics education. It suggests how participation in (Sfard, 1998) this cultural narrative, The Romance of Mathematics, may have shaped our beliefs and norms outside the realm of pure, disciplinary mathematics (to the extent that such a distillation exists).

Epistemology

Epistemology, the philosophy of knowledge and knowing, is central to the work of researchers ostensibly (per our positivist-shaped void) tasked with knowledge production. Whereas traditional Western philosophy constructed epistemology as outside of or prior to culture, the true span of epistemic consideration is wider: considerations of the (oft unwritten) rules of what counts as knowledge, who can be considered knowledgeable, and what knowledges are valorized or marginalized are key to epistemic consideration (Walter & Andersen, 2013). More perhaps than any of the other categories of worldview I am discussing, epistemology often receives a great deal of explicit consideration, a trend powerfully visible in the reflections and writings of researchers:

> What takes people in about the scientists is the grand display they make of the machinery by which their petty findings are dredged up—explanations in technical language of how the data was collected and how much of it, how different factors were weighted, what safeguards were built against distorted interpretation, etc. Actually, instead of a portrait of society, one gets a view of the sociologist's workshop with some charts on the wall. (Rosenberg, 1960).

Here, Rosenberg reflects on the valuing of epistemology reflected in the published works of much social science research, while also alluding to the lack of coherence he perceives between the goal he perceives in research (to paint a portrait of society) and its outcomes (some charts on

the wall). Almost incidentally, Rosenberg also surfaces a distinction between what aspects of epistemology are the object of focus versus those left tacit. For example, much explicit attention is given to the questions of what counts as "data" (i.e. what counts as "usable" pre-analysis information and observation) and to developing rules regarding how that data gives rise to *knowledge*. In contrast, it is commonly unquestioned that it is possible to be *objective*, that researchers are the only (or the primary) people qualified to guide the questions asked and outcomes of research, and that *knowledge* is cumulative and not internally contradictory or otherwise in tension with itself. The commonplace epistemic goal of research frames its goal as one of surfacing absolute or general principles related to given measures based on the noticing of empirical regularity (Goddard & Wierzbicka, 1994; Smedslund, 2004; Wierzbicka, 1996), a goal which I note stands on the foundation of ontological realism.

As with ontology, the epistemic assumptions around the mathematics education methodological center also reflect our fields relationship to mathematics (and, by proxy, our fields relationships to Platonism, Cartesianism, and other relevant philosophies). Our epistemic values are informed by the epistemic values of mathematics, as for example through a valuing of logic to the exclusion of emotion (Bowers, 2019c). Four of Lakoff and Núñez's seven pillars of The Romance related to ontology, and two more relate here to epistemology (p. 340):

- Since logic itself can be formalized as mathematical logic, mathematics characterizes the very nature of rationality.
- Since rationality defines what is uniquely human, and since mathematics is the highest form of rationality, mathematical ability is the apex of human intellectual capacities. Mathematicians are therefore the ultimate experts on the nature of rationality itself.

As with ontology, it seems participation in (Sfard, 1998) this cultural narrative of The Romance of Mathematics may have shaped our beliefs and norms outside the realm of pure, disciplinary mathematics (to the extent that such a distillation exists).

Axiology

Axiology, the study of ethical and aesthetic value, deals with the intrinsic and extrinsic principles that shape our perception and practice. Axiology is oft overlooked in methodological consideration (e.g. Biddle & Schafft, 2015), but palpably shapes every aspect of research: our sense of how we do *good* while doing research, our sense of what questions are *interesting* or *worthwhile*, and even our sense of what we expect "good" research to look like (e.g. grammar, vocabulary, organization). Adding complexity, these values exist not just in the researcher, but also separately and rarely identically in the products and practices of research itself (Walter & Andersen, 2013).

In our field's methodological center, it could be said that axiological values follow from (or are built on the foundation created by) ontological and epistemological beliefs. Ethically, *good* research is research that aligns with ontological realism, follows its associated epistemic rules for knowledge production, and ultimately is perceived to succeed in surfacing (or contributing to surfacing) absolute or general principles related to given measures based on the noticing of empirical regularity. Aesthetically, *good* research is research that fulfills the socially-constructed *aesthetics of objectivity*—It looks like *familiar* research already positioned as objective (e.g. familiar section names, familiar sentence construction, familiar jargon), it doesn't trigger strong emotional reactions which would signal subjectivity (Bowers, 2019c), and it tries to draw implications across as broad a population as possible. Work that does not adopt these appearances can be met with swift exclusion (Howe, 2009).

Furthermore, at our methodological center we see a unique axiological valuing of mathematics. Here, the final of Lakoff and Núñez's seven pillars of The Romance becomes extremely relevant (p. 340):

- Mathematics is the queen of the sciences. It defines what precision is. The ability to make mathematical models and do mathematical calculations is what makes science what it is. As the highest science, mathematics applies to and takes precedence over all other sciences. Only mathematics itself can characterize the ultimate nature of mathematics.

In other words, mathematics (and its subsumed cultural values) is commonly perceived as hierarchically strictly superior to other forms of reasoning.

Social Position

Our social position comprises much of who we are socially, economically, culturally, and racially. Social position is not just about the individual or individual choices—class, culture, race, gender, sexuality, (dis)ability/neurodivergence, and so forth deeply shape worldview, not least because so much is taken for granted. Social position is thus a verb rather than a noun. As researchers and as people, we do, live, and embody a social position (Walter & Andersen, 2013). While I can make no claims regarding the social position of you, dear reader, I can make some observations about how social positioning is commonly treated near our methodological center. In short, it is almost exclusively (and, I would add, perniciously) treated as a source of potential bias. Indeed, within our bounds of ontological realism and concomitant concern for objectivity in episteme and aesthetic, it is difficult to imagine what other role social position could play. In this Laplacean science, "a description is objective to the extent which the observer is excluded and the description itself is made from a point lying de jure outside the world," (Prigogine & Stengers, 1984, p. 52) and so somehow the observers social positioning must itself be

methodologically excluded from investigation. This brings us full-circle back to the topic of methodocentrism where this paper began:

> As a result [of valuing certainty, predictability, and objectivity], Western science becomes caught up in what we call 'methodocentrism': the belief that particular, pre-formed methods can guarantee the validity of an intellectual investigation into the world by factoring out the vicissitudes of the observer's entanglement with the world (see Said, 1979, pp. 9–10). To use a word that is crucial for Stengers's (1997) conception of science, *methodocentrism* is about trying to minimize the 'risk' of intellectual investigation, an avoidance that *ultimately produces bad science.* (Weaver & Snaza, 2017, pp. 1055-1056; emphasis added)

Related to earlier observations around The Romance of Mathematics (Lakoff and Núñez, 2000), I also note that mathematical social position is used as a gatekeeper not just for students, but also for researchers; work that is perceived to be "insufficiently mathematical" may be subject to steep resistance from the methodological center (Battista, 2010; Confrey, 2010; Heid, 2010; Martin, Gholson, & Leonard, 2010). Though such gatekeeping tends to be rhetorically framed in strictly disciplinary terms, it is tightly related to other systems of domination such as the abled, cis-hetero patriarchal, white supremacist Capitalism (Martin, Gholson, & Leonard, 2010; Moore, 2020; Pais, 2012).

The Foundation of Anarchist Methodology: The Non-negotiables of Anarchist Worldview

Anarchists and (mathematics) education researchers generally share convergent interests regarding social (in)equality—that is to say, both groups share a concern over noticing inequality and making efforts to pursue social justice. "Anarchists are principally and generally motivated by the presence of social inequality and domination to take action" (Williams, 2012, p. 10), and educational researchers have now spent decades producing such a volume of research

noticing/analyzing inequality that printing the aggregate work (even of only the subset written exclusively by white cis-hetero men) might well blot out the sun. However, when looking beneath the surface, differences quickly materialize. Of particular note for our purposes, anarchist activism often displays a coherence between worldview and impact/method that educational research aspires to (Stinson, 2020).

Having explored methodology above, and especially the methodological center of mathematics education research, in this section I articulate in broad terms the worldview that acts as a foundation for anarchism and that will be used to create an alternative methodological space, a perspective from which to look upon the *center* from the *outside* and experience any tensions that may arise out of that experience. Whereas I ordered the prior section to begin with Ontology, reflective of the primacy of the Ontological assumptions at our methodological center, this time I begin with Axiology since this forms the non-negotiable foundation of anarchist worldview.

Anarchist Axiology

For the purposes of this paper, I place emphasis on anarchism as an articulation of ethics (Bowers & Lawler, 2021b), as a mode of human organization with social self-determination, rooted in the experiencing of daily life (Suissa, 2010). Anarchism, specifically social or communal anarchisms, holds a conceptual connection between freedoms of the individual and social equality, emphasizing cooperation, mutual aid, and rejection of hierarchy. “I am not myself free or human until or unless I recognize the freedom and humanity of all my fellow men” (Bakunin, in Suissa, 2010, p. 44). Anarchism values humanizing relationships that minimize if not eliminate coercive structures and interactions, taking seriously the hope for an equal and free society. Bakunin (1971) argued that the human is only truly free when among

equally free humans; “the freedom of each is therefore realizable in the equality of all” (p. 76). Concisely, to embrace any form of anarchism is to express profound skepticism toward skewed, coercive, and exploitative power relations, and to reject all forms of oppression, including those of class, race, gender identity, religion, etc. (Lawler, 2019).

Anarchism is the absence of hierarchy, organized on core values of *cooperation*; *mutual aid*; and *freedom from unjustified, coercive hierarchy* (e.g. abled, cis-hetero patriarchal, white-supremacist Capitalism). These three principles, taken together, form the foundation of anarchist worldview: We work together, we do so for the benefit of all, and we treat coercive hierarchies with extreme skepticism (we seek liberation, the antithesis of coercion). Note that anarchists do not reject all hierarchy per se; expertise, for example, can still be recognized. As Bakunin (1871) reflected:

> Does it follow that I reject all authority? Far from me such a thought [SIC]. In the matter of boots, I refer to the authority of the bootmaker; concerning houses, canals, or railroads, I consult that of the architect or the engineer. For such or such special knowledge I apply to such or such a savant. But I allow neither the bootmaker nor the architect nor savant to impose his authority upon me. I listen to them freely and with all the respect merited by their intelligence, their character, their knowledge, reserving always my incontestable right of criticism and censure.

Anarchist Ontology

While the anarchic principles on which we build this methodological frame do not presuppose a particular ontology (or epistemology), they do foreground particular ontological (and epistemological) directions, substantively narrowing the array of ontologies (and epistemologies) we might consider reasonable. Phrased in the most concise possible terms, the

ontological stance of an anarchist researcher is one of profound humility: that humans and nonhumans are complex, and that we are complex in ways that resist meaningful simplification (Smedslund, 2009; Weaver & Snaza, 2017). Efforts to simplify the human are, by definition, dehumanizing, and would thus conflict with our anarchic axiological foundation.

To efficiently convey a sense of the magnitude of this complexity within the confines of this manuscript, here I surface four ontological characteristics of the human (note that the complexity amplifies when one extends beyond sole consideration of the human) and observe how they constrain one of the oft-touted goals of educational research—namely, the aforementioned goal of surfacing absolute or general principles related to given measures based on the noticing of empirical regularity (Goddard & Wierzbicka, 1994; Smedslund, 2004; Wierzbicka, 1996). These principles have been associated with the ongoing disconnect between educational research and educational practice; they are principles that practitioners must take for granted, while research commonly tries to evade or methodologically exclude them (Smedslund, 2009; Weaver & Snaza, 2017).

Principle 1: Openness. The openness of the human means that, in principle, every single psychological/behavioral measure, and hence every composite measure, is open to an indefinite number of possible influences, depending on how the situation is varied and how the task is understood.

Principle 2: Irreversibility. People are intentional (e.g. trying to pursue good outcomes or avoid bad outcomes), and do not completely unlearn or forget. Thus, observed regularities are conditional upon stable perception of outcomes, rendering absolute or general principles impossible. A valid general principle would entail a limit to intentionality, since it could not be modified by changing outcomes.

Principle 3: Shared Meaning Systems. People are forever part and parcel to innumerable overlapping shared meaning systems—the cultures of family, friends, workplaces, countries, regions, religions, ethnicities, and so forth. Regularities surfaced in research commonly reproduce what we already know (explicitly or tacitly) by virtue of their contingency on shared meaning systems.

Principle 4: Uniqueness. Chance plays a prodigious role in all aspects of our lived experiences, both inward and outward (e.g. Bandura, 1982). Serendipity and misfortune shape people in surreptitious ways, imposing a rigid barrier betwixt the ways the human is and the possibility of developing absolute or general principles.

Anarchist Epistemology

Feyerabend (2010) argued for and outlines an anarchistic theory of knowledge (this was the subtitle of the first edition). Like us, Feyerabend's motivations in writing that text were built upon an axiological foundation:

> Anger at the wanton destruction of cultural achievements from which we all could have learned, at the conceited assurance with which some intellectuals interfere with the lives of people, and contempt for the treacly phrases they use to embellish their misdeeds. (p. 265)

The overarching thesis statement of Feyerabend's text is simply stated at the outset:

> Science is an essentially anarchic enterprise: theoretical anarchism is more humanitarian and more likely to encourage progress than its law-and-order alternatives… history generally, and the history of revolution in particular, is always richer in content, more varied, more many-sided, more lively and subtle than even the best historian and the best methodologist can imagine. (p. 1)

In essence, just as I describe the anarchist researcher as ontologically humble, Feyerabend describes an anarchist researcher as epistemologically humble. Indeed, I note that ontological humility almost demands epistemological humility, as I illustrated above in relating ontological principles to barriers to one of the commonly touted epistemic goals of hegemonic science.

To the anarchist researcher, anything goes; or rather, you are always more free than you realize you are. An anarchist researcher might use virtually any epistemic method to make sense of or shape the world, even methods that seem contrary to their perspective, as when anti-rationalist Feyerabend regularly made rationalist arguments to discomfit his rationalist opponents and friends (e.g. Lakatos). Viewing science (in our broad conceptualization) as a pedagogic project, one wherein we are forever learning with and from others, and imagining hegemonic science as institutionalized schooling, we find this reflection rooted in Freire and Rancière to be particularly meaningful:

> The unschooled world is only feared by those who have been thoroughly schooled. The emancipated world has no enemies among the truant. None among children and none among artists. None among those who would take equality as a point of departure. (Bingham & Biesta, 2010, p. 157).

Anarchist Social Position

Obviously I can still make no particular observations about the specific social positioning of you, dear reader. However, the anarchist researcher does adopt a particular relationship with social positioning. In short, the anarchist researcher takes social positioning seriously, and may use it as a guide for noticing blind spots or disproportionate emotional/physical labor demands. Additionally, anarchist positioning is worthy of note in-of-itself, for it necessarily runs deep (per our axiological foundation), contrary to the disparate professional positionings that others may

tend to write off as "just part of the job." (I observed previously how this kind of thought may point to a lack of cohesion between worldview and methods/impact)

Anarchists take social positioning seriously (though people who don't have been known to attempt to co-opt the title). Per our axiological foundation, anarchists oppose unjustified, coercive hierarchies, including those of race, gender/sexuality, class, dis/ability, religion, nationality, and so forth. None of these hierarchies are individual monoliths—they silently embrace and dance a dance of violence, holding each other so close that their boundaries blur and disappear. Thus, anarchists are also deeply invested in intersectionality, variously in terms of: noticing and responding to the complex ways various intersections of identity shape lived experiences, accounting for constructed invisibility and cultural obfuscation of the multiply marginalized, and working to build solidarity across those of disparate backgrounds suffering at the hands of the same deathly waltz.

Furthermore, there are additional aspects of social positioning and hierarchy that are relevant to (mathematics) education researchers in particular. An anarchist researcher recognizes that they bear unique experience, knowledges, or tools that another might not have immediate access to, but will nonetheless express extreme skepticism of the many coercive and unjustified aspects of the hierarchy which places researchers epistemically above others as knowers and learners. Relatedly, an anarchist researcher is deeply skeptical of the epistemic and social hierarchy that perceives established scholars as superior to emerging scholars, as well as the epistemic and social hierarchy that perceives "teachers" as superior to "students." An anarchist researcher further opposes hierarchies of discipline, such as the *Romance of Mathematics* (Lakoff & Núñez, 2000), the still commonplace mythology that contemporary disciplinary mathematics is superior to other disciplines or disciplinary perspectives.

As one final note that distinguishes this methodological approach from those typically constructed as existing at the center rather than the margins (work constructed on the margins, such as indigenous methodologies, is more likely to intentionally share this characteristic), anarchism as methodology is not limited to professional situations—it is a lifestyle. To borrow a metaphor from educational philosopher Lynn Fendler, imagine yourself as a chef, passionately dedicated to your craft. Can you dissociate the qualities of your ingredients from the qualities of the food they are used to create? By the same token, in our work as researchers, is it really possible to dissociate the qualities of the researcher from the qualities of the research they produce? To create the most delicious dish, we use ingredients that carry the qualities we wish to be present in that dish. To create the most ethical research, we must use ingredients that carry the axiological qualities we wish to be present in the research (Vellanki & Fendler, 2018).

Clarifying by Disturbing–Liberating by Imagining: Methodological Spaces in Conversation

> In [critically engaging with one's worldview], the frantic search that novice (and even seasoned) researchers experience in selecting theoretical frameworks and methodological approaches more times than not becomes self-evident and trivial. (Stinson, 2020, p. 13)

Having sketched above the outlines of the worldview(s) associated with both the methodological center and with anarchism, in this section we take the next step and consider *method*. In contrast to worldview, where so much is left tacit in day-to-day life, methods tend to be more explicit. Consequently, for this section I will elaborate on anarchist method only, treating it as a given that readers will be familiar with many (most?) of the methods used across the methodological center of education research. As I elaborate on the possibility space of anarchist method, I will put it into conversation with the methods utilized by the methodological center of mathematics education research.

Mapping Worldview to Method: The Possibility Space of Anarchist Method

In this section I use the anarchist worldview described above to infer elements of the possibility space of anarchist research method. This space is vast, even as it excludes swathes of normative research methods (for example, psychometrics in its normative context—that is, the context of the worldviews and purposes that commonly underlay it—fall in steep conflict with an anarchist worldview). Thus, my goal is to be illustrative rather than exhaustive. In particular, I draw attention to three categories of method that have proved meaningful in my own work: collaborative action and design research, discourse-shaping and radicalizing research, and work that stands as iconoclasm of the oppressor within.

Collaborative action and design research

Despite ill-informed representations perpetuated by the media and other sources, the most likely places you might find anarchists in your community are at your local community garden, baby pantry, workers union, or co-op (we, the authors, have participated in each of these). These are loci of cooperation and mutual aid, places where people have noticed their community has a need that they can help to fill. As researchers with specialized knowledge(s) that can be leveraged for the benefit of our communities, one notable analogue to these aforementioned spaces in research is collaborative action and design research. Action and design research represent an orientation to knowledge creation that arises "in a context of practice and requires researchers to work with practitioners [and other stakeholders]... its purpose is not primarily or solely to understand social arrangements, but also to effect desired change as a path to generating knowledge and empowering stakeholders." (Huang, 2010, p. 93)

Note that whereas more normative research might prioritize *knowledge* as a means towards *change and empowerment*, Huang instead describes pursuing desired *change* as a means

to *knowledge and empowerment*. Along with relating to our axiological foundation, this also ties into the ontological and epistemological humility we referenced previously. In short, the goal of collaborative action and design research is to support communities, as for example through the collaborative development of "new theories, artifacts, and practices that can be generalized to other schools" (Barab, 2014, p. 151) or areas of praxis.

Discourse-shaping

Every publication, presentation, seminar, lesson, and conversation is necessarily a political act. Interaction either reifies or perturbs boundaries and beliefs, forever modifying the ideological and material translucence we occupy (Dubbs, 2021). Whenever we converse, the question is never "should I be political or not," for we are necessarily political in manners either hidebound or progressive. Instead, the question is, "in what ways should I be political?" or "in what ways should I shape this discourse?" Conscious of this, the anarchist researcher seeks to shape discourse in ways that advance our ethical goals of cooperation, mutual aid, and freedom from unjustified, coercive hierarchy. We might, for example, publish critical works in typically acritical spaces (Bowers & Küchle, 2020) in an effort to normalize critical perspectives therein, thus paving the way for further change or revolution. Discourse shaping is always a component of the work of any researcher (consciously or not), but for the anarchist researcher it can also serve as a goal in-of-itself, whether that means mobilizing/radicalizing potential future researcher-activists or simply offering a moment of critical introspection to an audience not often engaged in such.

Iconoclasm of the oppressor within

White supremecy, cis-heterosexual male supremecy, abled/neurotypical supremecy, capital supremecy… each of these (and other) oppressive paradigms/hierarchies surround us and can act through us.

> The true focus of revolutionary change is never merely the oppressive situations which we seek to escape, but that piece of the oppressor which is planted deep within each of us, and which knows only the oppressors' tactics, the oppressors' relationships (Lorde, 2007, p. 118)

The anarchist researcher has an ethical responsibility to always consider the ways oppressive systems may act through us, below the level of consciousness, notably (but not solely) along continua wherein our identity and/or positioning might place us among oppressors. For example, a white researcher might be aware that whiteness is acting through a system in which they participate, such as mathematics doctoral coursework. It is common for disproportionate burden to be placed on BI-POC (Black, Indigenous, and People of Color) to surface white supremacy (with analogues applicable to each other system of oppression), so the white researcher might dedicate careful time, energy, and attention to analysing and thinking through how whiteness is acting in those spaces, then share what they surface with other researchers subject to similar positional blindness (e.g. Bowers, 2019a). With this sort of persistent, critical reflection, we seek to free ourselves from such hierarchies of domination—by sharing this work with others, we engage in yet another type of cooperation and mutual aid. While we emphasize the ways positional blindnesses and disproportionate systemic expectations might make this work more important along the lines of our oppressive identities/positionings, we do wish to mention that such supremacies are commonly internalized along the lines of our marginalized identities as well, as when internalized neurotypical supremacy or cis-heterosexual male supremacy rears its

ugly head in the work, thought, or action of this neurodivergent (autistic, ADHD), genderqueer author.

Methodological Spaces in Conversation

In this section, I put *anarchist mathematics education* in conversation with our *methodological center*. The goal here is not to be exhaustive, but to draw conscious attention to a few tensions that have been particularly meaningful in my work—tensions that I experienced as an outsider attempting to make sense of the cultural center of mathematics education research—thus giving at least a few explicit directions for ongoing reflection. I do not aim to resolve any of these tensions, for as elaborated at the outset, it is the very experiencing of the tensions that is my goal. Thus, in this section I discuss the following: (1) Our goals as mathematics education researchers, (2) our relationships to emotionality and to the political, (3) our relationship to disciplinary Mathematics, and (4) tensions around certain oft taken-for-granted tools of research. One key tension I've experienced and re-experienced over my time in educational practice and research has been the question of what the central goal(s) and purpose(s) of research are. This purpose, as constructed by the methodological center, has been characterized as a quest to surface absolute or general principles related to given measures based on the noticing of empirical regularity (Goddard & Wierzbicka, 1994; Smedslund, 2004; Wierzbicka, 1996); more generally, even for those skeptical of this specific framing, the goal is commonly to discover or construct knowledge. As someone chiefly concerned with equity and social justice, this never made sense to me. True, many researchers at the center share these concerns, but they are often secondary (or tertiary); to these researchers, knowledge is a means to change, but a lifetime of seeing knowledge fail to lead to change has left me deeply suspicious of this approach. In contrast, the purpose of anarchist mathematics education lies precisely in social relations:

cooperation; mutual aid; and *freedom from unjustified, coercive hierarchy.* These ethical tenets are our purpose, in of themselves (Bowers & Lawler, 2021a, 2021b), pursued through avenues made possible by our specialization and expertise. Thus, as mentioned previously in reference to action and design research, to an anarchist researcher new knowledge is secondary to equity and social justice. For an anarchist researcher, a research project that produces new sanctioned knowledge but doesn't positively affect the lived experiences of research participants and proxies is not a success, while a project with the inverse qualities is absolutely a victory.

A second interrelated tension that has had its claws planted firmly in my mind for years has been the question of what role emotion and politics can or should play in research (Bowers, 2019b, 2019c). At the methodological center of mathematics education, the answer might be rather firmly characterized as one of antagonism: Emotions and politics exist as threats to objectivity, and it is the goal of researchers to strip their work the former for the sake of the latter (Bowers, 2019c; Weaver & Snaza, 2017). In contrast, an anarchist is more likely to adopt the perspective of Freire: Emotions and the political are naturally part of the human, our goal is the emancipation of the human (as through carrying out our ethical tenets), and consequently "the educator has the duty of not being neutral." (Freire, 1970) Stripping emotion and politics from our relationship to each other and to our research is necessarily dehumanizing (as these are qualities of the human), and doing so would present a threat to the emancipatory goals of anarchist research.

A third tension, whose prescience has grown increasingly keen in my mind over the years, is the tension of our relationship with mathematics. For a researcher at the cultural center of our discipline, *The Romance of Mathematics* holds sway (Greer & Mukhopadhyay, 2012; Lakoff & Núñez, 2000): Math is the best science and the best discipline, mathematical reasoning

is the best reasoning, and so forth. From this foundation, mathematics primarily becomes a gatekeeper, a means of excluding work that fails to hold it in due reverence (Battista, 2010; Confrey, 2010; Heid, 2010; Martin, Gholson, & Leonard, 2010). In contrast, though the anarchist mathematics education researcher undoubtedly loves mathematics (why else would we find ourselves doing this work?), we do not hold it to be superior and are openly suspicious of hierarchies that would treat it as such. For an anarchist researcher, that love of mathematics is a call to hold it to a higher standard (Bowers, 2018, pp. 289-291; Ernest, 2016), a call to critical reflection, a call to embrace blurred boundaries and interdisciplinary aesthetics. For a traditional researcher, mathematics may seem an alcove of objective safety, a locus of axiomatic love; for an anarchist researcher, mathematics is the object of both great love and great suspicion, for our love of what it *can be* does not excuse what it *often is*: A system of domination and oppression (Bowers, 2018, pp. 289-291; Ernest, 2016; Greer & Mukhopadhyay, 2012).

As a final note, I want to draw your attention to a few of the commonly taken-for-granted tools of research at the methodological center which exist in tension with anarchist worldview—this does not mean that an anarchist would never use these tools (for example, if you want to impact a specific audience in a specific way and the audience values these tools, there might be cause to use them), but it does mean that they will be treated with suspicion and care. In particular, I draw your attention to *coding* and to *interrater reliability*, two tools which are incredibly common but which are potentially problematic from the perspective of anarchist worldview.

Coding is a form of compartmentalization, one specific means of categorically isolating objects, practices, or information. Compartmentalization is endemic to colonization and other hegemonic discourses, standing in stark contrast to anarchism and to the many indigenous

knowledge systems that carry the qualities of social anarchism, viewing life as holistic, complex, and interdependent (Battiste, 2013; Bishop, 1988; Pinxten, van Dooren, & Harvey, 1983). Compartmentalization serves very real and destructive functions in hegemonic discourse, both insofar as "compartmentalizing complex wholes into disparate pieces facilitates the naming and ordering of those pieces and parts in order to have dominion over them," (Patel, 2016, p. 19) and in the sense that focus on individual parts and factors obscures more holistic views and makes it more difficult to challenge overall systems (Patel, 2016).

Interrater reliability is not so directly problematic as coding, but the sense an anarchist might make of interrater reliability is different than the sense someone at the cultural center might make of it. If we are examining a completed research project, interrater reliability tells me nothing of the *validity* or *truth* of what is being conveyed. Instead, it says only that the perspective represented by the findings/analysis represents more than one person. An anarchist, per our ethical tenets, will value work that represents a diversity of perspectives. However, in the "ordinary" case, where each rater is themselves a mathematics education researcher, the gestalt perspective thus conveyed is not substantially different from the perspective of either individual. This is not to say that there can not or will not be differences, perhaps even large differences, between raters; but it is to say that they will have much more in common than two people of equivalent positioning but for whom one is a student, a teacher, or elsewise an expert in some disparate area.

Conclusion

Mathematics education research is methodocentric. As with any hegemony or ethnocentrism, the systems and processes of reification tend to "operate at a level below consciousness; they remain unexamined or even unnoticed, in which case the task at hand is to

render them visible and expose them to critique." (Greer & Mukhopadhyay, 2012) In this paper I sought to render methodocentrism visible by posing a position outside of our methodological center from which we might look back upon what was once normal as if it was strange (Bowers, 2019b), or minimally by experiencing this outside position as strange while using moments of discomfort as pointers towards what was taken for granted (Wheatley, 2005).

Critical thought is necessarily an inadequate force of change when not accompanied by critical praxis. The additional step of critical praxis has presented a hurdle to many, a fact at once shocking and wholly unsurprising—unsurprising, because critical and social justice work can't be built on a foundation of oppression such as that symbolically and materially reified in the norms and methods of much mathematics education research, but shocking, because a new reality lies just out of sight over the horizon. I hope that along with rendering some of our unquestioned self visible, this glimpse of one such alternate reality, one such critical praxis developed through a cohesion of theory and practice, might offer a glimpse over such a horizon. While throwing off the reigns of oppression might seem at times an insurmountable challenge, I look forward, in solidarity, to basking under the warmth of new suns.

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CHAPTER 4: RHETORICAL STASIS: THE FAILINGS OF "WHERE'S THE MATH" AND "BOTH/AND"

In much of my work, such as it is, I explore either tacitly or explicitly the concept of change without change – the winds of hegemony draw us ceaselessly towards its shore, often in ways that might operate below the level of consciousness such as norms of rhetoric or practice (e.g. Bowers, 2018, 2019a, 2019b; Bowers & Küchle, 2019; Bowers & Lawler, 2020). Here, I wish to continue that exploration with a tight focus on two interrelated rhetorical moves that are minimally recurrent and arguably saturated within mathematics education discourse: "Where's the math?" and "We need both/and." This is not the first time tensions related to these phrases have been surfaced (e.g. Battista, 2010; Confrey, 2010; Heid, 2010; Martin, Gholson, & Leonard, 2010), but their use continues undiminished and unrelenting, anima inferna, and consequently there is an ongoing need to resurface these problems in different ways such that they might be heard and wrestled with by a yet broader audience. Here, I aim to accomplish that by articulating these problems in a humanities-oriented (AERA, 2009), genre theoretical (Freedman & Medway, 1994), and firmly anarchic fashion (Bowers & Lawler, 2020)–I offer a humanistic narratively-driven focus on rhetorical impact, so that we may ask, "is this the impact we wish to have through our rhetorical choices and norms?"

To preface this, I would like invite readers, and especially readers who might sometimes feel it is inappropriate to engage with their emotional ways of knowing with the same intensity as it is to engage with logical ways of knowing, to take seriously what our emotional and physical knowings can reveal to us beyond the pale of raw Cartesian or Kantian logic – Contemporary Mathematics and social science enculturation invite focus on the latter to the exclusion of the former, but there is much to be gained by noticing and engaging with our more visceral

reactions. When we notice what disturbs us, what energizes us, what makes us cringe or laugh or cry, we are noticing something real about the way our selves and our knowings/beliefs are interacting with the dense tangle of beings and meanings we are forever embedded within (Wheatley. 2002). Even in work that centers embodied cognition, it is rare to engage fully and deeply with the researchers' or readers' physical knowings, but as I think writings such as Lorde's (1982) demonstrate in beautiful fashion, so much is lost when we make no space for this.

Where's the math?

> "*If you do not understand white supremacy–what it is and how it works–everything else you know will only confuse you.*" -Neeley Fuller

This quote, posted in a public digital forum dedicated to equity and social justice in mathematics education, resonated instantly with my mathematical experiences. I'm white, mind you, but I'm also queer and autistic, and the sense of solidarity I felt was palpable–neurotypical supremacy and cis-hetero patriarchy infuse our world in ways analogous (but distinct) to white supremacy, and my experiences and choices seem perpetually confusing to those who haven't reflected long and deep about these lines of marginalization. Shallow analyses of/within mathematics education research, generally made by cis-hetero neurotypicals, constantly observe or recommend ideas and practices that have no (or only a superficial) relationship with the mathematical experiences of myself and those like me. I thought, for example, about how research and practitioner communities so regularly advise pedagogues to provide a student like me with explicit, direct instruction and closed tasks (e.g. Cadette et al., 2016; Flores & Ganz, 2009; Hicks et al., 2011). I thought about how this approach had, in fact, closed me off to mathematics for decades of my life. Closed tasks were patronizing and unengaging, and explicit/direct instruction left me with little or no room to have my own divergent approaches

taken seriously. I understood why neurotypical researchers might look at certain types of data and make these kinds of claims (you should definitely consider tacit modes of assessment and try to make them explicit for students like me–we can't always perceive the expectations our peers take for granted), but it seemed my actual experiences would just leave these researchers confused. Although Neely Fuller's quote was not about *my* experiences in mathematics classes, it nonetheless resonated with me, both insofar as it echoed aspects of my experiences and insofar as "I am not free while any[one] is unfree, even when [their] shackles are very different from my own." (Lorde, 1981)

> "*Where's the math? This group is dedicated to equity and social justice in mathematics education, and I don't see the relevance of this post.*"

The reply was not surprising, but certainly vexing. On the surface, it was a very reasonable question, and one that was taken up by others. After all, the prompting quote makes no explicit mention of mathematics, and mathematics is core to the identity of this digital group– I certainly can't judge someone who didn't immediately see their mathematical experiences reflected within the quote for having this thought cross their mind. However, if we take a step back for a moment, we might find ourselves less apologetic towards the voicing of the thought. Consider the string of events in this short exchange, and the implications carried by the voicing of "where's the mathematics?":

A teacher or researcher sought out or encountered the quote. They identify the quote as relevant to the groups goals or conversations and share it. A different group member reads the post and does not perceive the mathematics. The reader must certainly know the poster perceived relevance, else they would not have posted it. At this point, what role does "where's the mathematics" serve in building a discourse? Minimally, it serves the role of putting the onus on

the poster to articulate the relevance rather than on the reader to reflect on the relevance. Noting the trends we might anticipate regarding respective positionings of poster and reader (e.g. BIPOC being more likely to experience this particular quote as relevant than white people), what we have is a discursive trend (in the language of genre, we might call it a *trope*) that constrains the voices of the marginalized and pressures them to justify their existence and experiences ad infinitum instead of pressuring the privileged to reflect deeply and critically.

Thus, "where's the math" becomes a veiled way to ask the marginalized to justify themselves, to articulate their experiences in nice, bite-sized chunks, for easy consumption. It constrains against discussions of social justice in mathematics education. It constrains against marginalized people participating in these conversations. It modifies the breath of futurity in distinctively conservative fashion, giving momentum to unreflective privilege while stalling critique.

This, of course, all took place in a relatively informal setting, and we might reasonably wonder if "where's the math" serves similar or different roles in more formal mathematics education spaces. To get some sense of this, let us turn our attention to the aforementioned exchange prompted by calls to action in the Journal for Research in Mathematics Education (JRME) as well as at research symposia for the National Council of Teachers of Mathematics (e.g. Battista, 2010; Confrey, 2010; Heid, 2010; Martin, Gholson, & Leonard, 2010). In this exchange, several researchers advanced or upheld the position that "Where's the Mathematics?" should be at the forefront of our minds when determining what *mathematics education* research receives the formal sanction of our community (Heid, 2010), while others questioned and problematized this disciplinary positioning (Martin, Gholson, & Leonard, 2010).

So, in parallel to our informal social media example, we imagine one or several researchers preparing and submitting a manuscript to JRME or one of its analogues. An editor/reviewer reads it, and does not perceive the mathematics, and so moves to reject or substantially revise the piece. How does this shape our broader discourse? As before, the reader(s) must certainly know the submitter(s) perceived relevance, else they would not have prepared or submitted it. At this point, what role does "where's the mathematics" serve in building a discourse? As before, it serves the role of putting the onus on the submitter to articulate the relevance rather than on the reader to reflect on the relevance. Noting the trends we might anticipate regarding respective positionings of submitter and reader, what we have is a discursive trend, a rhetorical trope, that constrains the voices of the marginalized and pressures them to justify their existence and experiences ad infinitum instead of pressuring the privileged to reflect deeply and critically. Given that our disciplinary establishment is necessarily comprised of those who have survived (or even thrived in) abled cis-hetero patriarchal white supremacist capitalism, Martin et al. point to the steeply politically conservative influence this has on our discourse: "Young scholars and graduate students are particularly vulnerable if the subtext of these statements is on pursuing what is valued in the field, as decided by those in positions of power, versus choosing what they want to make their life's work." (p. 13) When those who have already defined the limits of our collective identity continue to police those boundaries, the result is tautologically conservative–"What I have done is mathematics education, and mathematics education is what I done."

In responding to concerns like those of Martin et. al. (2010), the anxiety and belief that undergird this tendency are laid bare: The anxiety that *mathematics education research* could lose its identity, and the belief that complete or partial apolitical action is possible. Regarding the

former, we see claims such as “A lack of significant attention to mathematics in mathematics education research results in the marginalization of the entire field,” (Confrey, 2010, p. 29) and “There is a risk that, if this trend continues, research in mathematics education will likely lose its identity.” (Harel, 2010, p. 4) Regarding the latter, we have both direct assertions of apolitical impact/intent (Harel, 2010, p. 2), as well as disavowal of connections drawn by Martin et. al. (2010) between rhetorical impact and nominally rejected conservative politics (Confrey, 2010, p. 31). In short, we see some of the foundational assertions of abled white cis-hetero male fragility (e.g. DiAngelo, 2011): “What we are doing is essentially apolitical, and what we are accomplishing is in defense of our identity.” I will respond to these two beliefs in turn, before following the transition the latter makes possible into my next point regarding the response that typically concludes conversations about “Where’s the Mathematics?”: “Both/And.”

Mathematics is not Apolitical

Although the socioemotional weight and firmly political nature of mathematics is well-acknowledged (and theorized against; e.g. Martin, Price, & Moore, 2019) among contemporary equity scholars, the notion remains generally unnormalized within or beyond the discipline. Thus, I mention here a few reasons I have previously surfaced (Bowers, 2018, pp. 289-291) for taking seriously the subjective and apolitical nature of mathematics (Ellis & Berry, 2005)

Mathematics is neither objective nor value-free. Focusing first on the former, Ernest (1991) identified and refuted several assumptions required for an absolutist view of mathematics, the view that mathematics is certain and unchallengeable. Without recreating the entirety of Ernest’s argument, I will highlight several key take-aways in support of the opposing fallibilist view of mathematics: (1) The informal proofs that mathematicians publish are commonly

flawed, (2) there now exist proofs that cannot be checked by humans for correctness, and (3) we cannot know that any but the most trivial of axiomatic mathematical systems are secure.

I focus now on the latter, that mathematics is not value-free. To that end, I make the following non-exhaustive list of some ways in which mathematics is value-full:

- Aesthetics drives all aspects of mathematics, from what mathematical questions people ask to the ways they construct argument and proof for inspection by others (Burton, 1999; Sinclair, 2009; Wells, 1990).
- Mathematics and mathematical meaning-making vary from culture to culture, indicating that mathematics itself is a cultural product (D'Ambrosio, 1985; Lipka, Wong, Andrew-Ihrke, & Yanez, 2012; Meaney, Trinick, & Fairhall, 2013; Thomas, 1996).
- Mathematics is socially-mediated and mathematical proofs are discursively constructed (Burton, 1999; Lakatos, 1976).
- The version of mathematics taught in schools and practiced by mathematicians is Eurocentric (Joseph, 1987).

  People of marginalized backgrounds have different experiences with mathematics than white males for reasons that cannot be explained by effort or ability (Martin, 2009; Stinson, 2013)

Note that these arguments that mathematics is not value-free can be taken as further support of the fallible nature of mathematics, since these values will influence what sorts of mathematical questions are asked, what can be taken as evidence in favor of mathematical claims, and generally what counts as mathematics or mathematical knowledge (e.g. Thomas, 1996).

In short, we cannot escape questions of the sort raised by Martin et. al. (2010) in response to "Where's the Mathematics?" We must what mathematics, for whom, and for what purposes.

We must recognize that "Where's the Mathematics?" is a politically charged and extremely conservative (in the sense of reinforcing the status-quo) line of inquiry. Asking "Where's the Mathematics" shapes what people, what knowledges, and what behaviors are welcome in our professional spaces, to the exclusion of many groups constructed as marginal.

The Protected Identity

The identity protected in the asking of "Where's the Mathematics" is, of course, the identity of Mathematics as core to mathematics education research – not all mathematics, but specifically hegemonic Mathematics, with all its constituent Whiteness, Maleness, Abledness, and so forth, as reified through specific ontological, epistemic, and axiological values (Ernest, 2016; Lakoff & Núñez, 2000). This is an intriguing choice, because not only is it not the only option, but it stands in active conflict with some of the other beliefs expressed by the voicers of "Where's the mathematics?" In his graph-theoretic analysis of published discourse in upper tier journals of mathematics education (Educational Studies in Mathematics; The Journal of Research in Mathematics Education, etc.), philosopher Christopher Dubbs observes:

> Whenever we call something mathematics education research, we either reify existing lines along which something is included or excluded from the foam of mathematics education research, or we perturb them. We can blow additional air into bubbles that exist, we can reach in with our fingers and pop them, or we can blow—and hope—that a new bubble will emerge. The beauty of it all is that we cannot be sure what will happen. We can, however, be sure that things can change. Mathematics education research has not, and does not currently, have a fixed definition. Mathematics education research does not have a fixed, and proper, object of study. And it should not. (Dubbs, 2021, p. 165)

Mathematics education is not a monolith with a singular identity. Instead, mathematics education is an amorphous collection of bubbles—conversations are raised or dropped; motivations expressed, rescinded, or revised; new conversants join a conversation while others leave, or perhaps just daydream for a time… Mathematics education is froth and foam, and we may at any moment shatter or breath new life into its constituent transience (Dubbs, 2021).

"Where's the Mathematics," treated as a gatekeeping question, advances bubbles that honor the hegemony and represses those that don't. Yet, we could easily imagine a different gatekeeping question: "Where's the social justice?" Even the critical respondants to Martin et. al. acknowledge, in one form or another, that equity is *the* (or one of the) most important issue to be considered in contemporary mathematics education (Battista, 2010; Confrey, 2010), and yet the alternative question is never proposed. We could instead, as is proposed at one point in Bakker, Cai, and Zenger's (2021) exploration of future themes for mathematics education, choose to ask "Where's the social justice," to "develop norms wherein it is considered embarrassing to do 'uncritical' research," wherein "there is no such thing as 'neutral,'" and wherein "we should be cultivating norms that recognize the inherent political nature of all work, and norms that acknowledge how superficially 'neutral' work tends to empower the oppressor" – "We must recognize the existence of but not cater to the fragility of privilege." (p. 12) We could, in short, take seriously the failures of our disciplines social justice agenda (Pais, 2012), and seek to create something different, something better. We could live a professional reality that does not vacuously end the conversation with both/and. It is not enough to say "We need both *equity* and *Mathematics*," when one does not critically consider the manners in which these two goals can be at odds with each others (Ernest, 2016).

Both/And

I conclude at the same place these conversations always culminate: “Both/And.” To be clear, it is not unreasonable to believe (or to advance the belief) that we need both mathematics and equity – I certainly agree. However, when those two categories are not constructed as equal, as when one focus is more/less oppressive than the other, than this response advances equity only symbolically and not materially. In parallel to Dubbs’ (2020) observations regarding Sfard’s (1998) metaphors for learning, who diverges from the claim that “it is essential that we try to live with both” (p. 8), I do think one focus can be said to be better than the other, with *better* being that which is more equitable. Uncritically asking “Where’s the mathematics? or responding with “both/and” without a critical lens reifies oppression and marginalization, and it will continue to do so until such time as “We… normalize (and expect) the full taking up the philosophical and theoretical underpinnings of all of our work (even work that is not considered ‘philosophical’)” (Bakker, Cai, & Zenger, 2021, p. 12) As it stands, “Both/And” is a product of late abled cis-hetero patriarchal white supremacist capitalism and neoliberalism, a signifier for the confrontation of postmodernity contra modernity, and as such it enables a disarmament of ideas that would otherwise be directed at critiquing late capitalism. In contrast to Hegelian synthesis, “Both/And” bypasses the negative moment of determination. Thus, "Both/And" isn't really "Both/And…" it's just an exercise in neoliberal thought.

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CHAPTER 5: CONCLUSION AND PARTING THOUGHTS

> The white conservatives aren't friends of the Negro either, but they at least don't try to hide it. They are like wolves; they show their teeth in a snarl that keeps the Negro always aware of where he stands with them. But the white liberals are foxes, who also show their teeth to the Negro but pretend that they are smiling. The white liberals are more dangerous than the conservatives; they lure the Negro, and as the Negro runs from the growling wolf, he flees into the open jaws of the "smiling" fox. One is the wolf, the other is a fox. No matter what, they'll both eat you. (Malcolm X)

In this dissertation, both through and around its text, I have sought to embody the mindset of anarchist mathematics education. Every thought, every syllable, every pixel, has been dedicated to that, especially though the embodiment of the ethical tenets of cooperation, mutual aid, and freedom from unjustified, coercive hierarchy. In pursuit of change, as well as in pursuit of growth, I have also pushed myself to embrace vulnerability. Vulnerability and risk are necessary prerequisites for building a new world (Pais, personal communication, May 2021), and so I have pushed myself to embody more of my identity than ever before in both the form and content of what I have written here. Now, in these final moments, I leave you with one final synthesis statement, one final call to action: Be not satisfied with centrism or the status quo, and force yourself to sit with the tensions that you have the privileged capacity to escape.

In closing, I share a poem, one written in the midst of completing this dissertation, deep in reflection about the foxes and wolves of our own professional community:

It was so good of you to compromise

They shot us right between the eyes

Saw us through the haze of fear

Maybe we're black, autistic, and/or queer

They were armed and so full of fear

but it was so good of you to compromise

Then they locked us in a cage never to be found

Our parents were hated on sight

And in an unending imperial night

They continued to rip us out of sight

but it was so good of you to find the middle ground

Cold wind cold nights no healthcare no rights

Most valued in the fear of our becoming

The mice on wheels keep running and running

Lest they be enjoined to our becoming

but it was so good of you to look past *justice* and seek the center, right?