

Introduction

Exploring the *Mathematics-Rationality-Human* Continuum

it was the system of knowledge itself;
it's not a matter of what you can do
inside it

*PROUD FLESH INTER/VIEWS: SYLVIA
WYNTER (2006), 31*

These pages originate from a simultaneity that I feel requires space to become a force for change. The simultaneity is this one: as I am writing these words and as you are reading this mathematical knowledge is being killed. And with this killing of mathematical knowledge ways of thinking and ways of living are killed too (Brunner 2023, Elías 2020, Spivak 1988).

Histories of Indigeneity and histories of womanhood teach us that killing has many layers and some of them are epistemic layers. The witch hunts in early modern times targeted the bodies of women connected to knowledges that did not move in accordance with capitalist-patriarchal interests such as knowledge about abortion (Brunner 2023, Chollet 2023, Federici 2014, 61 f.) The witch hunts committed as part of colonial takeovers and attacks targeted nonwhite bodies bearing knowledges that threatened Western supremacy and the project of colonialism (Elías 2020). So, I speak of the killing of knowledge because this phrasing brings up the killing of bodies and the two are inextricably interwoven in (at least) three ways: the killing of bodies is a killing of knowledge, the killing of knowledges brings the killing of bodies, and the killing of bodies comes with epistemic systems and movements that legitimate the killings of bodies (e.g. Federici 2014, 61 f.).

When mathematical knowledge is killed our stomachs ought to twist because we know that whenever knowledges are killed it is never the only killing. And as with patriarchal-colonial-capitalist witch hunts, the killing has a system to it that actualizes ongoing hegemonic power relations shaped

by intensely intertwined histories of colonialism, patriarchy, capitalism, and ableism. There are hegemonically powerful actors in place that fashion the universalization of a particular knowledge in an attempt to ban all other manners of thinking and knowing to a realm of ‘non-knowledge’: In the context of the witch hunts, the hunted women and their practices of knowing and knowledge-making were conceptually devalued and stigmatized through the same movements that fashion the figure of the witch as another mode of working against knowledges in that do not accord with capitalist-patriarchal systems (Chollet 2022, Federici 2024). In the context of mathematical knowledge, it is Indigenous mathematical knowledges and practices that continue to be excluded from school curricula world-wide only for Western mathematics to be instituted as the only mathematics – *the universal one* or *the neutral one* (Hottinger 2017, Shulman 1996, Bishop 1990). This universalized Western mathematics is what I will refer to as *Mathematics* – a distinctly Western, patriarchal, and hegemonic understanding and practice of mathematics that is instituted as if it were the only to exist.

This erasure of Indigenous mathematics qualifies as a form of epistemic violence as Spivak originally defined it as the silencing of knowledge formed from marginalized positions or the silencing of knowledge that does not actualize hegemonic relations of power (see Spivak 1988, 67, 77, 93). This kind of epistemic violence is realized precisely through the conceptualization and institutionalization of *Mathematics* as the only – *the universally true* – mathematical knowledge. This epistemic violence enables and legitimizes the ongoing epistemicide (the killing of knowledge¹) of Indigenous mathematics. To summarize what we know so far: there is epistemic violence realized through *Mathematics*. However, this thesis will argue that the epistemic violence actualized through *Mathematics* is even deeper and more extensive than instances of mathematical epistemicide. In fact, I believe those instances are the tip of the iceberg to what I understand as the core of epistemic violence: the *Mathematics-Rationality-Human* Continuum. Exploring the continua of violence and the continua of killing in their relation to the *Mathematics-Rationality-Human* Continuum will be at the core of this work, because it enables us to mathematical practices in their potentialities for violence and their potentialities for resistance.

1 Epistemicide describes the systematic erasure of knowledge often connected to genocide on people, see e.g. Brunner 2023 and Elías 2020. On the erasure of Indigenous mathematics see Hottinger 2017 and Bishop 1990.

Tracing Epistemic Violence

Mathematics – Rationality – Human

In light of this aim, this thesis the first tackles the objective to explore Mathematics as a form of epistemic violence. This objective brings up two questions: 1) What is understood as *Mathematics* in this work? 2) What is understood as *epistemic violence* in this work? In answering these two questions, I lay the foundation for my following claims: *Mathematics* is an *Image of Thought* in the way Gilles Deleuze establishes the notion (Deleuze 1968, 169 f.). Mathematics is both a notion of what thinking is and a way of thinking. In my understanding of Deleuze's notion, this *Image of Thought* actualizes an *Image of Being* in the sense that it realizes notions and ways of being. Resultingly, an Image of Thought is never a purely epistemic creature, but an ontological one too because an Image of Thought actualizes distinct modes of perception. These distinct mode of perception then structure being² – they shape and legitimize the possibilities, impossibilities, and widely known ways of being. My reading of Deleuze here is inspired by Sylvia Wynter and reads Deleuze's notion of the Image of Thought in light of her work on the interwovenness of exclusive genres of thinking and exclusive genres of being (Wynter 2006, -2003).

Epistemic violence is a term that different works and discourses relate to in a multitude of ways. I believe there is a spectrum of ways to relate to the notion of *epistemic violence* that is structured by two poles. There are ways to relate to the notion in a very specific, focus manner – such as when applying the notion for critiquing the philosophical canon (see e.g. Bratu 2024 or Schulz 2024) – and there are ways to relate to the notion of *epistemic violence* in a deliberately extensive manner with an emphasis on 'knowledge itself' (Spivak 1988, 67, 77, 93 and Wynter 2006 (interview), – 2003, – 1994). I understand epistemic violence with strong emphasis on Spivak's work and by relating the notion to the work of Sylvia Wynter. As such, in my understanding the hegemonic exclusiveness of the Human lies at the core of epistemic violence and is inextricably interwoven with exclusive epistemic modes and resources with limiting

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- 2 I understand 'structuring being' as similar to the notion of preemption by Brian Massumi (see Massumi 2007). What is actualized is actualized even before it comes into existence and even without being actualized because that which partakes in preemption shapes what comes into existence and how it does so. This is similar to mathematical performativity on the finance market where the dynamics of the market become increasingly similar to mathematical models applied to describe the market.

modes of thinking and a white-masculine-neurotypical version of rationality (*Rationality*). So, to me the *Rationality-Human* continuum both is and actualizes epistemic violence. Understanding epistemic violence by reading Spivak and Wynter together speaks to the ontological dimensions of epistemic violence, i.e., that *thinking* and *being* are inextricably interwoven.

In bringing these two answers together and back to the objective of exploring *Mathematics* as a form of epistemic violence, the proposition of this thesis arises: there is a *Mathematics-Rationality-Human* Continuum that forms an exclusive *Image of Thinking* that actualizes epistemic violence. I modify the Deleuzian term *Image of Thought* to *Image of Thinking* to emphasize that I am speaking here of a practice, a process, and a doing³. The *Mathematics-Rationality-Human* Continuum consists of its three interwoven founding concepts each one being an *Image of Thinking* that bears and shapes an *Image of Being*. As a continuum they operate to actualize epistemic violence and a multitude of hegemonic *Images of Thinking* and *Images of Being*.

I employ the notion of *being* here in the sense of *being as a practice*, drawn from both Wynter and Deleuze in their shared insistence on the interwovenness of *thinking* and *being*. *Being* in this account is a continuous process that does not amount to any result or a path leading to a point X. *Being* is a process and a practice, but it does not imply leading any place as it is not a path – it is a manner of existence. I choose to stay with this notion of *being*, because I believe in a notion of *being* that describes a practice and that exceeds ontological terminology. The belief I have in *being* as a notion partly stems from the two-layered meaning of the word: *being*. *Being* can mean a) the substantiation of 'to be' or can b) stand in as a synonym for 'creature.' I understand this double meaning of the word 'being' as conceptually relevant and philosophically helpful, because it contributes to imagining and seeing various manners of existence in relation to the creatures (the beings) those manners of existing (manners of being) foster. In writing *thinking-being* in this work I imagine this double meaning too: I am a thinking-being and I am practicing thinking-being and the two are infinitely closely intertwined. It is this continuous becoming that is organized by the *Mathematics-Rationality-Human* continuum in an exclusive, an epistemically violent manner.

3 Understanding the *Image of Thought* as a doing and thinking practice is what Deleuze does as well. My slight modification thus moves in accordance with his work while rhetorically emphasizing that I read Deleuze through the work of Wynter and thus relate his concept of the *Image of Thought* to her understanding of *thinking* and *being*.

At the core of this thesis lies the question of *Mathematics* and my belief that what Wynter terms the *Man*-centric world is always the *Mathematics*-centric world too. The world that centers ‘the Rational Human’ (*the Man* in Wynters terminology) is the same world that centers *Mathematics*. This is because only through *Mathematics* as part of the continuum do *Rationality* and *the Human* enfold all the flavors of violence they actualize.

To put forth my understanding of *Mathematics* I employ *Image of Thinking* and *epistemic violence*. *Mathematics* is therefore a notion of thinking and a mode of thinking that forms modes of being. The contents of *Mathematics* as an Image of Thinking, as well as the consequences of *Mathematics*, are epistemic violence because they actualize hegemonic notions of *Rationality* and *the Human*. Crucially, I understand *Mathematics-Rationality-Human* as a continuum and thus write hyphenate them and when only one is mentioned the other two are always there too because *Mathematics-Rationality-Human* are layered into one another. Furthermore, I understand epistemic violence to bear an ontological dimension because I understand *thinking* and *being* to be inextricably interwoven – conceptually and practically.

I write ‘worlds’ here and throughout this work to re-call María Lugones (1987)⁴. Lugones’ work illuminates that there are different worlds in place now, many actualized, many more in-the-making, and in the realm of possibility, and impossibility. I understand ‘worlds’ to encompass this multiplicity. Furthermore, ‘worlds’ gives a sense of the depth and abundance of ramifications when it comes to epistemic violence. With the use of ‘worlds,’ I differentiate my understanding from accounts of epistemic violence that center on specific instances of epistemic violence i.e., on individualist accounts or on the notion of a system or a structure. Epistemic violence as I understand it makes worlds. These worlds then foster and center forms – potential norms of thinking and being. ‘Worlds’ emphasizes the importance of being (human) in relation to *thinking* when considering epistemic violence. As such, particular instances of epistemic violence, as well as systemic forms of violence or structural invisibilizations and erasures, are part of trans-historical movements of epistemically violent worlds.

4 The notion of ‘world’ and ‘world-making’ in this thesis is not drawn from Immanuel Kant but rather stands in the tradition of decolonial-feminist works, mainly the work of Lugones (1987) and the work of Julietta Singh (2021).

Exploring the Continuum

Mathematics – Rationality – Human

The primary aim of this thesis is to explore the epistemically violent *Mathematics-Rationality-Human* Continuum. This endeavor bears four temporalities, mirrored by the four chapters of this thesis.

The first chapter, *Bodies of Meaning: Mathematics, Rationality, Humanism*, moves in a historical temporality. Here I establish the *Mathematics-Rationality-Human* Continuum through exploration of its foundational moments in the history of philosophy. This chapter provides both evidence for and depth to the existence of this continuum by highlighting exemplary works in contemporary work on mathematics, in Ancient Greek philosophy, and in the philosophy of the Enlightenment.

The second chapter, *Epistemic Power as a Crisis of Subjectivity: Knowledge, Violence, Subjectification*, moves in a contemporary temporality. I explore the forms of violence actualized through the *Mathematics-Rationality-Human* Continuum with a special focus on im-/possibilities realized through the continuum. This is the exploration of *the now* and its violences. One crucial violence explored here is sexual violence as a violence rooted in the *Mathematics-Rationality-Human* Continuum.

The third chapter – *Meaningful Resistance: Epistemic Disobedience and Political Subjectivity* – moves at the temporality of a *future 1* – a future that is conceptually close to *the now* because it directly relates to *the now*, that is to say to the epistemic violence of the contemporary situation. Here the objective is to explore mathematical forms of disobeying *Mathematics*.

The fourth chapter – *wild mathematics: Towards epistemic wildness* – moves at a temporality of *future X*; that is a temporality from a different world and logic than the contemporary world. *Future X* is not necessarily far away in terms of hours/weeks/months/years, but it is of an entirely different fabric than the worlds that are actualized through the *Mathematics-Rationality-Human* Continuum. In this chapter, I move in relation to many traditions of epistemic resistance and to many endeavors of re-making worlds by relating them to mathematical practice. The objective is to propose a *wild mathematics*: an *Image of Thinking-Being*, that exceeds the *Mathematics-Rationality-Human* – centric worlds. This *wild mathematics* in an *Image of Thinking-Being* because *wild mathematics* commits to the interwovenness of thinking and being. The fourth chapter is the chapter of decolonial-feminist practice as a practice of thinking-being differently.

All four chapters follow their own respective methodology and together they map a landscape: the landscape that is moved and shaped by the interwovenness of mathematical knowledges, thinking-being, and varying forms of violence. These four different and particular methodologies arise from the four different temporalities these chapters are tending to: the historical, the contemporary, the future 1, and the future X. All of these temporalities are temporalities inhabiting and originating from the landscapes of the *Mathematics-Rationality-Human Continuum*.

The Thinking-Being of the *Mathematics - Rationality - Human Continuum*

The first chapter establishes the *Mathematics-Rationality-Human Continuum* with a distinct focus on *Mathematics* by conducting a historical study situated in the history of philosophy. My starting point is with contemporary works on *Mathematics* from the fields of psychology, philosophy, sociology, and physics. I establish the existence of the *Mathematics-Rationality-Human Continuum*, focusing on how *Mathematics* is actualized through the continuum and how *Mathematics* actualizes *Rationality* and *the Human*. I then establish this continuum as one that bears deep historical dimensions that has been with Western thought for thousands of years. Although its specific shape has shifted with through time, the continuum itself has a transhistorical existence. I exemplify this claim and further contextualize *Mathematics* by exploring selected works of Ancient Greek philosophy and of the philosophy of the Enlightenment. I choose these periods because they are both of distinct philosophical relevance in the sense that both periods of philosophy are especially present in philosophy curricula and thus intensely shape philosophical discourse. Throughout this endeavor I focus on how *Mathematics* and the *Mathematical Proof* are constructed and how these constructions and these makings are intrinsically related to philosophical logic.

The mathematical and non-mathematical practices exceeding *Mathematics* and the *Mathematics-Rationality-Human* continuum are always written diagonally across the continuum and always have been. However, the continuum works to turn those diverging practices into that which deviates from 'epistemic and moral goodness.' So, the universalization built into and built by the continuum is not a practice that erases what it conceptualizes as 'the Other' but it does seek this erasure. As such, it continuously practices and makes at-

tempts at erasure, but precisely because the erasure is never fulfilled both while epistemicide and survival of *the deviant happen, wild* knowledge happens too.

Thus, this chapter is located in a historical temporality, bears three dimensions, and fulfills three purposes: 1) to establish the transhistorical existence of the *Mathematics-Rationality-Human Continuum*, 2) to characterize *Mathematics* as an Image of Thinking, and 3) to introduce the relationship of *Mathematics* and Philosophy, which is mediated through the figure of *logic* and *proving*.

The Lives of the Continuum Subjectivity, Sense-Making, and Meaning

The second chapter explores the epistemic violence contemporarily actualized through *Mathematics*. To do so, it analyzes the layers of the *Mathematics-Rationality-Human Continuum* through lenses of Feminist Epistemology, Black Feminist Thought, and Decolonial Philosophy. As a result of these lenses, I focus on the forms of violence and limitation that *Mathematics* actualizes for subjectivity, sense-making, and meaning. The central concept of this chapter is the concept of epistemic violence, which I understand in relation to three notions. Firstly, epistemic violence as the exclusion from the human produces exclusive forms of subjectivity. Secondly, both forms of sense-making and meaning-making are epistemically violent and stabilize hegemonic relations of power. Thirdly, epistemic violence minoritizes thinking-being in non-accordance with the *Mathematics-Rationality-Human Continuum*.

Throughout this chapter sexual violence is explored as a case study in which violence serves as a continuum that implicates epistemic violence as well other forms of violence such as sexual violence. I propose to explore sexual violence as a dimension of the *Mathematics-Rationality-Human Continuum*.

At the heart of this chapter lie three objectives: 1) to establish *Mathematics* as a form of epistemic violence that results from the *Mathematics-Rationality-Human Continuum*; 2) to establish and showcase the inextricable interwovenness of epistemic violence with other forms of violence such as sexual violence; and 3) to expose the consequences of epistemic violence for processes of subjectification. All of these three objectives are brought back to *Mathematics* and situate *Mathematics* as a site/form of epistemic violence because of its role in the *Mathematics-Rationality-Human Continuum*.

Disobeying the Continuum

Subverting *Mathematics* – Rationality – the Human

The third chapter moves at a temporality of *Future 1*. The objective is to establish *Mathematical* forms of epistemic disobedience against the *Mathematics*-centric world. Crucially, in doing so the objective is not to abolish or exceed *Mathematics*, but to connect to the very real bodies of meaning, mattering⁵, and sensing⁶ it creates and to subvert, twist, and turn them. I do not understand this endeavor to be in any way opposed or even fundamentally different to movements that aim for a beyond-*Mathematics*. Rather, I believe there is a spectrum of possible and potential resistance against the *Mathematics-Rationality-Human* Continuum. One end of the spectrum of resistance is characterized by seeking strategic connectivity to the hegemonic body of meaning and the other end is defined by making it a point to not make the hegemonic bodies of mattering into a point of reference in endeavors of resistance.

Throughout this chapter I bring in forms and theories of epistemic disobedience and relate them to the case of *Mathematics*. Thus, the core objectives are: 1) to relate the case of *Mathematics* to established work on epistemic disobedience, and 2) to propose forms of mathematical disobedience.

Exceeding the Continuum

More Than-human *Mathematics*

The fourth chapter moves at a temporality of *Future X*. This temporality is constituted by the resistance that already moves in the different worlds as it actualizes in that very movement. The temporality of future X is the temporality of radical difference, the temporality of decoloniality – of thinking-being differently. Here, I draw from practices of epistemic resistance and relate them to

5 The notion of mattering is understood in close relation to the work of Karen Barad (Barad 2007) and Denise Ferreira da Silva (da Silva 2017): I understand mattering to be related to meaning and to questions of value. Crucially, I believe questions of mattering to be interwoven with questions of the meaning for the beings that *matter* i.e., those construed as *human*.

6 I understand sensing as any form of witnessing meaning and mattering. I understand sensing as the underlying interpretations and understandings that shape this world. Mattering is therefore the consequence of how meaning is structured as meaning decides what matters.

mathematical practice. Accordingly, I ‘think-with’ (Manning 2020) resistances already practiced in order to propose an Image of Thinking-Being – *wild mathematics*. These movements of thinking-with are a sensing, playing, and believing – a practice not in accordance with a figure of ‘writing about’ or ‘thinking about’ for the core is relationality, not hierarchy. This *wild mathematics* reappropriates the notion of wildness historically used for the stigmatization of marginalized people in moving with and as an epistemic wildness and a wildness of being. The notion of *wildness* here is employed in a similar vein to how Clarissa Pinkola Estés reads and writes the word (Estés 1995, 36) in which *wild* thinking-being is a practice of remembering and practicing what has always already existed with the bodies and beings made other to the *Man-Math*-centric worlds⁷.

The core objectives of this chapter are to: 1) commit to a practice of thinking-with the works that I relate to; 2) to establish *wild mathematics* as an Image of Thinking-Being; and 3) to propose *epistemic wildness* as a force that moves towards the worlds ever so different to the *Mathematics-Human*-centric world.

The Termite Tunnels of the Continuum

Locating This Work

When writing about one’s positionality in and one’s own relation to ‘the power/knowledge diagram’ Erin Manning brings up the image of termites: the termites chew away at the walls of the university to form their tunnels – they ‘eat the walls’ and ‘reshape them to their needs.’ In doing so, they bring ‘more-than human movements and durations’ (Manning 2020, 4). Furthermore, she writes: *In the end, we are the termites. We eat away at the structure, residing in the holes we create* (Manning 2020, 22). This work is conducted from within the termite tunnels and is itself a *chewing of the walls* – at the walls of the *Mathematics-Rationality-Human* Continuum.

I understand *epistemic violence* and the endeavors of this thesis as theoretical movements, which are interwoven with political and day-to-day struggles through violent worlds such as decolonial struggles, struggles against and amidst racism, feminist struggles, movements towards neurodiverse worlds, and against misogyny, and against sexual violence and misogynoir. With

7 Furthermore, my use of *wildness* is in alignment with how Jack Halberstam employs the notion as a pathway to thinking “race, sexuality, and the undercommons” (Halberstam 2024).

regards to some of these struggles, I carry situated knowledges with me as well as theoretical ones. With regards to others, I do not carry with me any situated knowledge and am especially indebted to those who taught me about the depth of coloniality, racism, and whiteness.

I understand the movements I have listed and many more as inextricably interwoven, because these forms of violence have been built to stabilize one another. I refer to the intricacies of this interwovenness by writing ‘decolonialfeminist’ non-separated.

I believe what is shared through various experiences of violence and struggles for resistance is the exclusion of the realm of *the Human* and of the realm of *the Rational*. However, this is not to say these experiences of exclusion are homogenous or happen to the same degree, which for both is not the case. What it does mean is that there is a ‘we’ moving through this work that bears immense multiplicity and difference – a ‘we’ that is not an academic one, and not one of one movement in particular. Rather it is a ‘we’ that realizes the moments where one has been banned from the logics of *the Rational* or *the Human* and from the metrics of the *Mathematics*-centric world. It is the ‘we’ of the very crazy ones. It is the ‘we’ of the disturbed ones – those disturbed by the worlds that are in place and disturbed by the *Mathematics-Rationality-Human*-centric world. *Craziness* here is not primarily a diverging from norms of thinking, but rather it is a practice of epistemic wildness – a practice of that which always writes itself diagonally across the continuum-based scripts. It is the ‘we’ of *woman* in the *Écriture féminine* or the ‘we’ of *Mad Studies* (e.g. Cixous/ Clément 1986, Fawn Montgomery 2018). It is the ‘we’ of radical difference to the continuum-centric world, and it is the ‘we’ of the ones who are kept awake because they can feel the need for different worlds haunting their very beings.