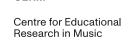# Knots of Knowing-in-Playing

Stories From Violin Lessons Read Diffractively Through Agential Realism

Mari Ystanes Fjeldstad

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Acknowledgements

Summary

This feminist new materialist and posthuman inquiry explores violin lessons held by three teachers and their students in Norwegian schools of music and performing arts (SMPA). In current research related to the Nordic field of SMPA, there is rich literature drawing on discourse analysis of policy documents and on interviews and surveys of leaders and teachers. This inquiry develops a broader insight into SMPA music education practices by also taking an interest in the mess and the matter of violin lessons: in the stickers falling off the fingerboard of the violins, the spiders interrupting the lessons, and the students coming late and without violins. The initial question guiding this inquiry is: *How are violin lessons enacted and what do they produce?*

The main theoretical framework of this inquiry is Karen Barad's agential realism. Barad builds their philosophy on reading insights from poststructuralism, critical social theories, and quantum physics through one another. Agential realism argues for the entanglement of knowing and being, for a performative worldview where the world is becoming through intra-actions rather than being constituted by pre-existing entities (realism) or becoming through social constructions (constructivism), and for an understanding of agency as not aligned with human intentionality. In this inquiry, agential realism is expanded by being read through Sámi studies, intersectional feminism, and affect theory.

The inquiry is a postqualitative inquiry that takes a thorough reading of theory as a starting point for developing research practices. I have intra-viewed three violin teachers and observed lessons with 2 to 7 of their students over periods of 5 to 6 weeks. During one of the observation periods, the lessons were held online due to the COVID-19 pandemic. The intra-views and observations, as well as diary entries and sheet music, are reworked into stories inspired Sámi and feminist storytelling traditions. Rather than being representations of past events, these stories are diffractive stories that are told and re-told, read and re-read, through theories to develop rich and nuanced insights into the enactments and productions of violin lessons.

Although the inquiry set out to generate answers to the question of how violin lessons are enacted and what they produce, the diffractive reading of stories through theories generated four concepts. The first concept, *topological togetherness*, emerged from reading stories from lessons through the agential realist notion of space and time. This reading provides insight into the spatial and temporal boundaries of violin lessons as porous and becoming rather than being fixed boundaries preceding the intra-actions of the lessons.

The second concept that emerged is *tentacular and agentic violins*. By taking the violins of the lessons as a starting point, I explore the agentic nature of violins and how they take part in the enactment of violin lessons. I also explore the tentacles of violins by tracing the strings connecting my own violin to makers, teachers, and students; to capitalist and colonial histories and economies; and to the gendered structures of Western classical music. The concept of tentacular and agentic violins offers insight into how the agency of violin lessons is relational and distributed rather than solely contingent on human intentions.

The third concept that emerged is *differential becomings*. By reading stories from violin lessons through intersectional feminism and agential realism, patterns of im/possibilities for becoming violinists in the intersections of race, class, and gender emerged. These patterns provide insights that might broaden questions of social justice in music education to not only investigate who is included and excluded but also to investigate the im/possibilities offered to different students once they enter music education.

Building on these three concepts, I propose the fourth concept of *knots of knowing-in-playing* as a useful way of engaging with the entanglements of material, discursive, and affective aspects of the enactments and productions of violin lessons.

This inquiry offers insight into the specific materialdiscursive practices of Norwegian SMPA. It also serves as an example of the possibilities offered by feminist new materialist and post-human music education research. I argue that these theoretical perspectives might matter in generating research that also pays attention to the matters and doings of music education. Thus, they might contribute toward fostering insights into how im/possibilities for becoming are created in SMPA and enable us to move toward the vision of an inclusive music education for all. They might also generate an understanding of knowledge as knowing-in-being rather than the trait of individual humans. Together, these insights might contribute toward research and policies that are more attuned to the practices of SMPA and, thus, better serve as preparation for teacher students entering the complex entanglements of matter, discourses, and affects that constitutes music education practices.

Samandrag

Denne feministiske ny-materielle og posthumanistiske studien utforskar praksisen i norske kulturskolar gjennom intervju med tre fiolinlærarar og observasjon av undervisninga deira. Det finst forsking som undersøker diskursane i rammeplanen til kulturskolen. Det finst også studiar som undersøker synspunkta til lærarar og leiarar gjennom intervju og spørjeskjema. Denne studien utfyller desse og bidrar til ei breiare forståing av praksisen i kulturskolen gjennom å også undersøke det uventa og materielle, til dømes klistremerke som fell av fiolinar, edderkoppar som forstyrrar undervisninga, og elevar som kjem for seint og utan å ha med seg fiolinen. Utgangspunktet for studien er ei interesse for korleis fiolintimar speler seg ut og for kva som vert skapt gjennom dei.

Det teoretiske rammeverket eg brukar er agentisk realisme, ein filosofi utvikla av Karen Barad. Agentisk realisme byggjer på kunnskap frå kvantefysikk, poststrukturalisme, postkolonialisme og feminisme. Teorien ser på etikk, ontologi og epistemologi som samanfiltra, den har eit performativt verdssyn der verda vert til gjennom intra-aksjonar, og den forstår aktørskap som noko som vert gjort heller enn som ein eigenskap knytt til menneske og våre intensjonar. I denne studien vert agentisk realisme utvida ved at den vert lesen gjennom samiske studiar, interseksjonell feminisme og affektteori.

Eg har gjennomført intervju med tre fiolinlærarar og observert undervisning med 2 til 7 av elevane deira i periodar på 5 til 6 veker. På grunn av koronapandemien, vart ein av periodane med observasjon gjennomført digitalt. Intervjua og observasjonane er, saman med dagboknotatar og notar, skrive om til historier. Desse historiene er inspirert av feministiske og samiske historietradisjonar. I staden for å vere framstillingar som representerer det som skjedde på fiolintimane, er historiene diffraktive historier som vert lest og lest igjen, fortalt og gjenfortalt, saman gjennom teoriar. Dette skapar rike og nyanserte forståingar av handlingane og aktørane som konstituerer fiolintimar.

Gjennom den diffraktive lesinga av historier og teori oppstod fire konsept. Det fyrste konseptet er *topologisk fellesskap*. Gjennom ei lesing av historier frå fiolintimar og den agentisk realistiske forståinga av tid og rom, utviklar eg ei topologisk forståing av korleis tida og rommet for fiolintimar vert til gjennom intra-aksjonar. Dette utfyller ei geometrisk oppfatning av tid og rom der rammene for fiolintimen er noko som eksisterer før sjølve timen.

Det andre konseptet som oppstod er *tentakulære og agentiske fiolinar*. Med utgangspunkt i min eigen fiolin følgjer eg trådane som knyt den til fiolinmakarar, -lærarar og -elevar, til kapitalistiske og koloniale strukturar, og til dei kjønna strukturane som eksisterer i vestleg,

klassisk musikk. Deretter tar eg utgangspunkt i fiolinane frå fiolintimane eg observerte, og eg utforskar korleis dei er aktørar som tar del i handlingane i timen. Gjennom å undersøke fiolinar som tentakulære og agentiske, utviklar eg kunnskap om korleis fiolintimar speler seg ut og om kva rolle andre aktørane enn menneske speler i dei.

Det tredje konseptet som oppstod gjennom den diffraktive lesinga er *ulike tilbliingar*. Gjennom å lese av historier frå fiolintimar saman gjennom interseksjonell feminisme og agentisk realisme vert u/moglegheitene for å bli fiolinistar synlege. Desse u/moglegheitene er ikkje tilfeldige, men knytt til etnisitet, klasse og kjønn, og til samspelet mellom desse kategoriane. Å undersøke korleis fiolintimar skapar ulike moglegheiter for ulike elevar bidrar til kunnskap om inkludering og ekskludering i kulturskolen.

Det fjerde konseptet som oppstod, og som bygger på dei tre andre, er *knutar av kunnskap-i-spel*. Det er eit konsept som rettar merksemda mot dei samanfiltra materielle, diskursive og affektive aspekta ved fiolintimar, og mot korleis fiolintimar spelar seg ut gjennom intra-aksjonar.

Denne studien utviklar kunnskap om fiolinundervisning i kulturskolen. Den er også eit eksempel på dei moglegheitene som oppstår i møtet mellom feministisk ny-materiell og posthumanistisk teori og musikkpedagogisk forsking. Eg argumenterer for at desse teoriane tilbyr moglegheiter for å skape forsking og styringsdokument som er nærare knytt til undervisningskvardagen i kulturskolen. Dette kan vere med på å førebu framtidige lærarar betre på den komplekse verkelegheita dei vil møte. Teoriane kan også bidra til musikkpedagogisk forsking som skaper betre innsikt i dei ulike tilbliingane som er tilgjengelege for ulike elevar, og dermed bidra til å skape meir inkluderande musikkpedagogiske praksisar.

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Chapter 1: Welcome!

> Granny nodded. "There's always a story," she said. "It's all stories, really. The sun coming up every day is a story. Everything's got a story in it. Change the story, change the world." (Pratchett, 2004, p. 339)

> It matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; it matters what knots knot knots, what thoughts think thoughts, what descriptions describe descriptions, what ties tie ties. It matters what stories make worlds, what worlds make stories. (Haraway, 2016, p. 12)

> Science and justice, matter and meaning are not separate elements that intersect now and again. They are inextricably fused together, and no event, no matter how energetic, can tear them asunder. (Barad, 2010, p. 242)

With these three quotes, I welcome you to this dissertation. The dissertation you are about to read investigates violin lessons in a Norwegian municipal school of music and performing arts. It is a feminist new materialist and posthuman dissertation that grapples with entangled questions of ethics, doing, and knowing using the agential realist framework developed by Barad (2007). And it is a dissertation that aims to move the world—at least the part of the world this dissertation concerns—toward being more just by telling stories that matter of playing, teaching, and learning music. The question guiding this dissertation is: *How are violin lessons enacted and what do they produce?*

When rereading these quotes[1] you might notice that they all, in different ways, engage with matter and mattering, meaning and meaning-making, science and justice, stories and storytelling. But where are the music and the music making? You will be introduced to them through a story from my days as a violin student.

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"No! You need to play into the string!"

My violin teacher stopped me in the middle of playing a passage of sixteenth notes. I knew the passage by heart. The Bärenreiter urtext edition of Mozart's Violin Concerto No. 3 in G Major, with thick, heavy paper and the title printed in gold letters on its bright red cover,

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1   I hope you reread them. And that you read this footnote although it might make for a slower reading. Through participating in a reading group on Barad's texts, I have learned about the joys of reading slowly and of carefully reading quotes, stories, and poems inserted in the "proper" text. I hope I have succeeded in writing a dissertation that might evoke the same joyful and slow reading experience for you.

was nothing more than a place for my gaze to rest while playing. I had practiced the piece on and off for 10 years.

The first time I heard the bright, optimistic opening chord of the concerto was when it was played by my violin teacher at the time. He played the beginning of the three most-played Mozart concertos and asked me to pick one. I immediately preferred the concerto in G major. Its opening phrases had a playful, almost teasing, quality.[2] But after 10 years of practice, I still could not play it to my current teacher's satisfaction.

"Again," he would say. "Use the weight of your arm."

I played again.

"Oh no, that's too heavy. You need air around every note."

I played again.

And again.

That spring of 2006, when I was about 24 years old and had studied music at a conservatoire level for some years, I spent a lot of time in the apartment of a great violin teacher trying to learn how to play Mozart. If you, like me, are a classically trained violinist, then you know that we are required to play the first movement of a Mozart violin concerto at just about every audition. One of the things that separates success from failure is the articulation of the sixteenth notes. I was painfully aware of how important it was for my future as a violinist to get them right.

But what is the "right" way of playing the sixteenth notes of a Mozart violin concerto? In that apartment, and at that time, there was one particular way of playing them right: the way my teacher told me to play them. Standing in the middle of his living room while my teacher was seated on the couch drinking Pepsi Max, I tried again and again to get the bow, the strings, and my arm to produce the articulation that could get me into the next study program or maybe even secure a job for me in an orchestra. My playing was accompanied by shouts of "Shorter, much shorter!" or "Get into the string, your arm is too light!" and, on rare occasions, "That's better. Good girl!"

One day, I played the opening chord of the first movement followed by some of the dreaded sixteenth notes. My teacher didn't stop me to correct the articulation after the first phrase. Not after the second phrase either. He let me play the whole first section.

"Good! You must have practiced well," he said with a rare nod of approval.

"Thanks," I replied.

But I had hardly practiced the last couple of days. Instead, I had traveled around Berlin trying about 50 different bows to find the one I liked the best. The approved articulation was the work of a well-balanced and flexible bow made by R. Dotschkail in 1950. It was outrageously expensive for a student like me. Although serious and hardworking, I knew then that

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2   The concerto, played by Janine Jansen and the NHK Symphony Orchestra conducted by Paavo Järvi, can be listened to here: https://youtu.be/9lEdb__gejs

I would never become a great violinist. But when I inherited money from my grandaunt and realized I had the opportunity to improve my playing tremendously in a couple of days by spending it on a bow, I grabbed the opportunity with both hands. Or the right hand, anyway. Carefully, with my very best bow hold.

. . .

Many years later, after teaching numerous violin students how to play sixteenth notes, I became a PhD student. My preliminary question was *What is it to know how to play the violin?* In the first semester of my project period, I took an introductory course in philosophy of science. The driving force behind the inquiry was the dissonance[3] I experienced between the epistemology and ontology presented to me as a novice PhD student and the onto-epistemological practices I was familiar with as a former violin student and a present violin teacher.

In the story of me trying to learn to play the sixteenth notes from a Mozart concerto, I try to make tangible not only the different elements of playing but also their entangled nature. The story introduces many aspects of playing, teaching, and learning music. The teacher telling how the playing should be done. The sheet music materializing generations of composers, musicians, teachers, and students. The student trying to fit into the norms and traditions of Western classical music. The instrument, in this story most notably the bow, playing a crucial, but often unnoticed, role in music making. The gendered structures of music education—no woman has ever called me a good girl after the age of 10—as well as the economic structures and the inherited money I spent buying an expensive bow. These are all material, discursive, and affective forces working in the story to create the playing, teaching, and learning done in violin lessons.

Taken separately, all of these forces could be understood using the philosophies I was introduced to. But these philosophies did not grapple with the entanglements. At least not in a way that worked for me. I wanted to engage with the bow *and* the arm *and* the norms *and* the shouts of "good girl" *and* the fear of not making it as a violinist and how they all worked together in entanglements. The story of me playing sixteenth notes is a story of entangled intra-actions—the actions that do not presuppose the independent existence of the agencies (Barad, 2007)—done by humans and nonhumans.

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3   Dissonances in thoughts are not to be avoided or feared. They are troublesome and they demand to be taken notice of and to be resolved, transformed, or stuck with. They urge us to stay with the trouble (Haraway, 2016), and, thus, they are generative and productive forces that might create new insights. In music, dissonance are diffractive patterns with relatively long intervals between its repetitions (Palisca & Moore, 2001). Consonances, dissonances, and other diffractive patterns are at play all through this dissertation.

Karen Barad[4] and Donna Haraway, the two philosophers I quoted above and whose thoughts will be present throughout the dissertation, are considered to belong to the field of feminist new materialist and posthuman theories and to a recent theoretical turn called the ontological turn. Feminist new materialist and posthuman theories enable a move from a representationalist worldview—an assumption that the reality is out there, represented by words or other cultural signs—toward a performative worldview in which attention is shifted from the accuracy between reality and representations toward "matters of practices, doings, and actions" (Barad, 2007, p. 135). These theories also enable a decentering of human intentionality and agency, and they emphasize the entangled doings of both humans and nonhumans.

When I first encountered feminist new materialist and posthuman theories, their onto-epistemological stand—the entanglement of ontology and epistemology—seemed revolutionary and new to me. But as I broadened my readings, I found that Indigenous philosophies also engage with the entanglements of the world and that they have done so long before the ontological turn. Reading the work of Barad, Haraway, and Indigenous scholars, in particular the work of the Sámi author Johan Turi,[5] paved a way by which I was able to do research that aligned with the way I play, teach, and learn music. Thus, I have moved away from my initial question of what it *is* to play the violin. Rather, I investigate the practices, doings, and actions of violin playing by asking *How are violin lessons enacted and what do they produce?*

By writing this dissertation, I aim to answer the question posed. I also aim to find other ways of posing the question. To *enact* does not convey the complexities of violin lessons and their intra-acting agencies. Similarly, to *produce* does not convey the entanglement of knowing and being. Dividing the question into *enactments* and *productions* does not take into account "the intertwining of ethics, knowing, and being" (Barad, 2007, p. 185). But, at this point, these words are the best I have.

The question of how violin lessons are enacted does not call for answers in the form of transcripts of lessons and interviews, nor does it call for analysis searching for categories of enactments. In the enactment of lessons, there are bodies and matter and affects that move in space and time, and the dissertation needs to relate to these movements and entanglements. Thus, I have chosen to engage with the enactments of violin lessons by telling stories. The stories are connected to, but not representing, lessons held by three violin teachers and a selection of their students aged 8 to 11 years. They are also connected to orchestra and quartet

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4   Barad's pronouns are they/them/theirs but the literature engaging with their work also uses she/her/hers.

5   The Sámi are the Indigenous people of the middle and northern part of Norway, as well as parts of Sweden, Finland, and the Kola peninsula in Russia. Johan Turi is considered to be the first Sámi to write a book in a Sámi language regarding Sámi life and traditions (Svonni, 2011). The stories told in *An Account of the Sámi* (Turi, 1910/2012) have inspired the way I think about stories and their relation to knowledge and knowing.

rehearsals the students took part in, concerts they played, interviews with the teachers, and my experience of teaching and playing the violin. The lessons took place in a Norwegian school of music and performing arts (SMPA).[6] They were held in classrooms and, after the outbreak of COVID-19, in online meeting rooms. My engagement with the practices of violin playing materialized as audio recordings, transcripts, notes, diary entries, sheet music, and practice plans before being reworked into stories.

The stories I tell are read diffractively through theories. The concept of diffraction works throughout this dissertation, and, in line with the practice of diffractive research, its meanings and doings will change as it diffracts through other concepts, stories, and texts. As a physical phenomenon, diffraction could be introduced as what happens when waves meet an obstacle and new wave patterns emerge. As a research practice, diffraction was first suggested by Haraway (1992), who, in turn, built on the thoughts of Trinh (1991/1997).

> Diffraction does not produce "the same" displaced, as reflection and refraction do. Diffraction is a mapping of interference, not of replication, reflection, or reproduction. A diffraction pattern does not map where differences appear, but rather maps where the effects of difference appear. (Haraway, 1992, p. 6)

Diffractive research practices are committed to understanding "which differences matter, how they matter, and for whom" (Barad, 2007, p. 90). In diffractive readings, different texts are read through one another to create new insights (Barad, 2007). In the diffractive reading of stories from violin lessons through theoretical concepts, I develop insights into how violin lessons are enacted and what they produce. Rather than articulating these insights as answers, I suggest four concepts. The concept of *topological togetherness* generates insight into how the space and time of violin lessons do not precede the lessons but become through its intra-actions. The concept of *tentacular and agentic violins* directs our attention toward how violins and other nonhuman agencies take part in the enactments and productions of violin lessons. The concept of *differential becomings* highlights how the possibilities and impossibilities for becoming different forms of violinists are created in the intersections of race, gender, and class. Building on these three concepts, I propose *knots of knowing-in-playing* as a way of conceptualizing the entanglements of knowing and being and for generating insights into the specific entanglements of the enactments and productions of violin lessons.

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6   In Norwegian, these schools are called "kulturskole". A direct translation would be "schools of culture." In the English literature engaging with these schools, many different terms are used. I use "schools of music and performing arts" as this is the term used in the English translation of the schools' curriculum (The Norwegian Council for Schools of Music and Performing Arts, 2016), and it is commonly used in the literature concerning the schools (e.g., Ellefsen & Karlsen, 2020; Nielsen et al., 2022).

Stories are, as Pratchett[7] reminds us, everywhere, and they are powerful. Or, as Haraway (2016) writes, it matters which stories we use to tell other stories with. By telling stories other than those dominating music education research, I aim to move music education toward being more just. By decentering the (adult) humans of music education, the agency of matter and children becomes tangible, and new insights into music education practices are generated. These insights allow for a greater attention to the possibilities and impossibilities for becoming different forms of musicians offered within music education practices and they might supplement research investigating questions of access and inclusion. The pressing need to tell other stories is created by the period of time we live: in the Anthropocene.

The Anthropocene

Much of our thinking relies on the separation of nature and culture; of what is already there and what is produced by humans. However, living with capitalism, colonialism, climate change, the extinction of numerous species, atom bombs, and large areas of the ocean—even space—covered with debris from human activities, this distinction is no longer useful. We are no longer in a world where we can claim that parts of it are "natural" in the sense of undisturbed or untouched by humans and our culture.[8] Geologists argue that our epoch is that of the Anthropocene, the epoch where no part of the planet, not even its atmosphere, is pure nature unaffected by human activity (Crutzen & Stoermer, 2000; Haraway et al., 2016).[9]

This is an enormous thought. There is no nature. Everything, the whole universe, is natureculture. To queer what counts as nature—as well as other normalized categories such as human/nonhuman, matter/discourse—is not done for the "easy frisson of transgression" (Haraway, 1994, p. 59). (Although I must admit that I do enjoy the tickling feeling of thinking something I have not thought before.) To respond to the planet's current condition of climate crisis is a serious matter. The imperative to queer what counts as nature comes from the hope of future livable worlds for humans as well as the other-than-humans through a will to "foster some

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7   Although written by an author and not a philosopher in the traditional sense, Pratchett's book series, Discworld, has influenced the way I think for decades. And it still continues to do so.

8   It might also be questioned if we ever were so. The Indigenous population of the Amazonian Forest, an area that have been considered "pure nature," first domesticated plants 8000 years ago. This cultural phenomenon had an important and lasting impact on the composition of the forest (Pärssinen et al., 2021).

9   Donna Haraway (2016) makes a persuasive argument that the Chthulucene would be a better name for "a kind of timeplace for learning to stay with the trouble of living and dying in response-ability on a damaged earth" (p. 2). Gough and Adsit-Morris (2020) add to her argument by pointing to a number of other terms that might better name the role of capitalism and capitalists in the current epoque. But for the sake of my argument that there is no separation of nature and culture, I stick with the more common Anthropocene.

forms of life and not others" (Haraway, 1994, p. 62) and to "nourish the infinitely rich ground of possibilities for living and dying otherwise" (Barad, 2017, p. 86).

The feeling of urgency caused by living in an age during which we might experience the full effects of climate change is part of the reason this dissertation became a feminist new materialist and posthuman dissertation. Reading the introductory courses of the PhD program, I noticed that the most recent philosophers we were discussing were born in the 1920s and 1930s. How could these thoughts possibly relate to the Anthropocene?[10] This doubt led me to ask one of our lecturers, Professor Emeritus Bernt Gustavsson, to tell me more about the questions contemporary philosophers were working on. His thoughtful answer sent me on a joyride down the rabbit hole of feminist new materialism and posthumanism.

A Feminist New Materialist and Posthuman Dissertation

The Anthropocene is the age of the human, but what counts as a human is not self-evident. It is given "by engagement in situated, worldly encounters, where boundaries take shape and categories sediment" (Haraway, 1994, p. 64). The Anthropocene has made it imperative to question the category of "human," including our assumed exceptionalism, and has led to a broad field of theories that contest the binaries of nature/culture, human/nonhuman, and matter/discourse. In education, the field of feminist new materialism and posthumanism—drawn together in the network of PhEMaterialisms (e.g., Strom et al., 2019)—builds on feminist theory, critical race theory, poststructuralism, science studies, quantum physics, and a critique of humanism (e.g., Barad, 2007; Braidotti, 2013; Haraway, 2016). Situated within this field, the main theoretical framework of this dissertation is the agential realism of Barad. I also draw on the work of Haraway, in particular her concept of SF,[11] and on Indigenous Sámi storytelling as well as affect theory and intersectional feminism.

This dissertation is a feminist new materialist and posthuman dissertation as it questions the givenness of the categories of human and nonhuman and examines the practices through which these boundaries are created. The new in new materialism might be read as there is something new at work, something that has not been here before. Barad (2007) critiques critical theories for being in love with "the new" and warn about the seductive pull of figurations equating the new with "youth, originality, chaos, and revolutionary breaks with the past" (p. 452, footnote 29). On the other hand, Baras do not endorse "the valorization of the old in the misguided equation of it with wisdom, indigenous knowledge practices, and a return to better times" (p. 452, footnote 29). Instead, Barad argues that the shift in temporality offered by agential

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10 Being slightly more conversed in philosophy now, I recognize the potential for them to do so.

11 SF stands for, among other things, science fiction, speculative futures, and string figures (Haraway, 1992, 2016).

realism undermines considering past and future as separate entities and emphasizes their entangled becomings. Likewise, the "post" in posthumanism signals an agential cut or a cutting together-apart (Barad, 2007, 2014) that is engaged with the possibilities and openings that are made possible by a creative critique of humanism. In other words, the relationship of "new" and "old" in feminist new materialist and posthuman philosophies is that of dis/continuity (Barad, 2010) rather than a linear evolvement; it is a generative reworking, deconstruction, and reconfiguring of materialism and humanism that holds the entangled past, present, and future. Feminist new materialism and posthumanism does not claim that humans no longer matter or that everything matters as much as the human. Rather, it is an ongoing questioning and dynamic reworking of humanism (Barad & Gandorfer, 2021).

Although this is a feminist dissertation, questions of gender equality are not its main focus. This dissertation is first and foremost feminist in how the dissertations itself works, in its feminist research practices and theoretical framework. Gender is of course part of violin lessons at SMPA, but the feminist understanding of the political and the feminist understanding of the world, not the research topic, is the basis for positioning this dissertation as feminist.

A Music Education Dissertation

I position this dissertation in the field of music education. "Music" is an ambiguous word inadequately capturing the diversity of what is perceived as music in a multitude of contexts (Showen & Mantie, 2019). Music is, among many other things, sound waves. When waves meet, they form diffractive patterns. A musical example of these patterns are consonances—diffractive patterns of waves pleasing to the ear. But music is more than sound waves. It is a cultural practice, an art form, an imagined sound in one's head, and a myriad of other constellations of discourses, matter, and affects intra-acting, and music give rise to several fields of study. When positioning this dissertation as a music education dissertation, I delineate it toward other neighboring fields also concerned with music such a sound studies, performance studies, musicology, music theory, music history, and music therapy.

Sound studies might be conceptualized as a body of scholarship interested in the ontology of sound "seeking to break away from culturally oriented questions of representation, signification and subjective experience" (Thompson, 2017, p. 270). Furthermore, music and its cultural, representational, and meaningful content is thought to obscure the material being of sound (Thompson, 2017). Rather than conceptualizing musical meaning and material sound as oppositions, one clouding the other, I think of them as different parts of the phenomenon I engage with. Thus, I do not further engage with sound studies in this inquiry.

Performance studies, musicology, music theory, music history, and music therapy are fields engaging with music but not with education per se. But as all musical practices involve learning, and as the body of literature on music education and feminist new materialism and posthumanism is rather small, I have included some literature from these fields in Chapter 2.

The particular music education practice I engage with in this inquiry is done in Norwegian schools of music and performing arts (SMPA). SMPA in Norway are situated in a larger context of institutionalized music education in Europe "characterized by a distinction between music education in public schools, municipal art and music schools and community music" (Kertz-Welzel, 2021, p. 4). Municipal art and music schools offer education to children and youth with a special interest in music, and they exist outside, but sometimes in close collaboration with, public schools (Kertz-Welzel, 2021). SMPA in Norway have a dual mandate as they aim to offer a leisure activity available to all children and youth, while they also qualify students with particular interest and motivation for higher arts education (The Norwegian Council for Schools of Music and Performing Arts, 2016).

How Does This Dissertation Matter?

This dissertation is an account of how I have been, and continue to be, moved by theories and practices. Although the speed might have slowed down a bit since the first period of frantic reading of Barad's work, my thoughts are still on the move, and the insights generated throughout this dissertation are not fixed. But nor are they aimless. They aim for justice and responsibility.

Barad writes that "we need to meet the universe halfway, to take responsibility for the role that we play in the world's differential becoming" (Barad, 2007, p. 396). This dissertation is one of the ways that I meet the universe halfway. I—this one letter word holding so many humanist assumptions will be troubled shortly—do my best to take responsibility for the part I play in the world's differential becoming. I try to be accountable and responsible for what matters and what is excluded from mattering in the intra-actions I take part in. Music and music education matter. Through the playing, teaching, and learning of music, parts of the world come into being in different ways than they otherwise would have been. If these doings are simplified to be purely done by singular humanist subjects, and if music is simplified to be an object represented or constructed, important aspects of the matterings of music education are not examined and, if needed, cannot be changed.

In this dissertation, other stories of music education materialize. These stories are stories in which agency is not restricted to humans and knowing how to play is not the trait of an individual human. By telling these other stories and by reading them diffractively through theories, other possibilities for doing music education research than dominant qualitative and humanist approaches emerge. Although not adhering to the divide between practice and research—research is a material practice and practice is a production of knowledge— this dissertation aims to move music education research toward being more attuned to the materiality, messiness, and playfulness of music education practices. It aims to create a space where curiosity, playing, and the joy of expanding what is possible to think are valued. In this space, it becomes possible to move music education research toward being more attentive to what music education creates and to demand responsibility and accountability for our part of these becomings (Barad, 2014; Barad & Gandorfer, 2021). An important part of this emerging responsibility and accountability is to pay attention to the possibilities and impossibilities for students' becomings that are created in the intersections of race, gender, and class.

This dissertation does not intend to offer insights into how violin teaching might be improved. Instead, the objective is to shift the ways in which music education is encountered by researchers and policy makers and to draw attention to the new ways of thinking, feeling, and sensing music education that are made possible when the everyday, in-between happenings are brought into the frame of inquiry. These new ways of thinking might, in turn, offer possibilities for developing a greater attentiveness and flexibility toward the messiness of everyday teaching for teacher students. The new ways of doing research might also contribute toward policy documents more attuned to music education practices.

When thinking with feminist new materialist and posthuman theories, the human subject of music education is no longer a singular subject acquiring or constructing knowledge and skills. And, maybe, it has never been so. The story I told at the beginning of this chapter underlines that music educational practices are already material *and* discursive *and* affective, done by humans *and* nonhumans in entanglements. The ability to play the sixteenth notes was made possible by my body and brain, the new bow, the teacher's instructions and expectations, the expectations and tradition of the larger community of violinists which I wanted to enter by being recognized as a violinist able to play the music of Mozart, and by the economic and societal structures that made it possible for me to spend hours in that Berlin flat taking lessons and to buy the expensive bow. Like music education, doing inquiry is also a practice of entanglements. Some of these entanglements are introduced in the following section.

On Writing and on Language

This postqualitative[12] inquiry takes reading philosophy as a starting point for doing inquiry, writing as a method of inquiry, and it aims to "follow the provocations that come from everywhere in the inquiry that is living and writing" (St. Pierre, 2017, p. 1). The dissertation you are about to read is not a product of my mind and my mind alone. It is a product of a multitude of entangled minds, like the scholars reading and writing in conversations with each other, me, and the reader, and of entangled bodies and matter. The inquiry was undertaken during a pandemic, and the troubles caused by the COVID-19 virus are a part of the becoming of the dissertation. Similarly, my violin and the violins of the students and teachers, the computers and the software we used in the online lessons, the network of family, friends, and social security benefits that made it possible for me to spend time doing things other than the bare necessities of raising and feeding our children, and multiple other agencies, took part in the materialization of this dissertation.

Haraway writes that there is no God trick, no neutral place from which one can observe the world from the outside (Haraway, 1988). This goes for writing as well. In Barad's (2007) words "the practice of writing is an iterative and mutually constitutive working out, and reworking, of 'book' and 'author'" (p. x). There is no neutral writing. All writing is also reading is also theorizing is also materializing. Neat and correct sentences are no more objective and neutral than the messy ones. The difference is to what degree the sentences trouble assumptions of scholarly writing. Furthermore, no word or sentence is outside of its intra-actions. In this dissertation, there are quotes and stories repeated. But they are not the same text in a new place. Both the text and the context are becoming through their intra-actions. Thus, the quotes and stories are not repeated as the same text, but re-turned, turned over and over, each time producing something new (Barad, 2014). In the following section, I explore some of the aspects of writing a dissertation that might be useful to discuss before I give you an account of the structure of the dissertation.

On Writing as an "I"

Writing a dissertation, like playing music, is not something done by an individual subject. It is done by intra-acting agencies. The "I" writing this and the "you" reading this are subjectivities that are differentially constituted through intra-actions (Barad, 2007).

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12   Although Elizabeth St. Pierre, the originator of the term, writes "post qualitative," I have aligned the spelling with the similar concepts of posthumanism and poststructuralism, and I use the spelling "postqualitative."

> Let me emphasize again the difficulty of speaking, and using personal pronouns, such as "I." It would be incorrect to assume that there is an "I" that decides on choosing where to make a cut. This is a humanist flattening out of what I am trying to articulate. In intra-acting there is no distance between the "I" and "the world." There is no "I" that acts from the outside; rather, it is intra-actively constituted through practices of sense-making. (Barad & Gandorfer, 2021, p. 30)

The "I" writing this dissertation is constituted by material, discursive, temporal, spatial, and affective intra-actions. When I—an intra-actively produced and fluid I—am writing, I do not always remind the reader of the posthuman concept of "I" like Murris (2022) does in using the neologism iii.[13] I have chosen to use the more common I and trust that the reader will read it as a posthuman and intra-actively constituted I.

Although not a fixed "I", the "I" writing this dissertation is becoming with social categories and global power structures. I am a white,[14] cis-gendered female, in my early 40s, and a mother, daughter, and wife. I write while living in Norway, a country that has an ongoing history of colonizing Sámi territories and erasing Sámi people, culture, objects, and onto-epistemology (Finbog, 2020). Norway, Denmark, and Sweden form the region Scandinavia. There were Scandinavian colonies in the Americas and in the Caribbean as well as trading posts in Africa and Asia, and Scandinavians took part in the slave trade (Naum & Nordin, 2013). These historic and ongoing categories and power structures are contested but, nevertheless, important, and I have tried to be mindful of the possibilities and impossibilities they create when doing inquiry.

On Writing With Others

Writing is an act of creating, of writing the world, and of becoming with the world I write. Writing is also an act of borrowing, and, in academic writing, the borrowing is often done through citations. Citations are an economy where citation counts are directly influencing career opportunities (Truman, 2021). The politics of citation, who cites who and who is not cited, shape fields of research, and the chains of citation often uphold racist and sexist structures in academia (Ahmed, 2017). Truman (2021) exemplifies the complexities of citational politics using 12 metaphors for thinking of citations. One of them is citation as mastery. To cite is to become a certain kind of researcher and "you become a theorist by citing other

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13   Murris (2022) uses three lowercase i's in grey to indicate "that a self is not a bounded singular organism, and that a posthuman analysis is not the same as simply adding the material to the discursive" (Murris, 2022, p. 91).

14   I follow the practice of not capitalizing "white" as a way of showing respect for Black, Brown, Indigenous and other racialized people. See Barreiro et al. (2020) for a justification for this.

theorists that cite other theorists" (Ahmed, 2017, p. 8). As Cannon and Holbrook (2019) state, quotes and citations

> show that we have done our work; they, in turn, give that work legitimacy. This borrowed language carries with it the residue of the authors' collected writings, their presence in the field, and the ways other scholars have taken up and contextualized/extended their words. In the academy, who we cite and how we cite matters. (Cannon & Holbrook, 2019, p. 171)

The mastery of citations—demonstrating that I have done my work and that I have done it in a responsible way—is a part of the process of becoming a researcher, which I have given a lot of attention to. The intra-actively constituted "I" writing this dissertation is writing in conversation with a number of scholars and their work, most notably Karen Barad and Donna Haraway. Barad and Haraway are closely connected in friendship, kinship, and scholarship. Haraway's answer to the question of whether or not Barad picked up the use of diffraction from her, expresses their intra-actions.

> Partly, but also from herself, from physics, and much earlier than 2014. She ended up developing diffraction with a depth and precision that was further and deeper than mine. But in the beginning, I think Karen was pushed to look at diffraction in significant part because I was using diffraction in the way I use it in this book, as a material semiotic enactment, not an illustration. And then she ran with it. There's a lot of relationally entangled collaborative joint and independent work here—in Karen's terms, **intra-action**. (Haraway, 2018, p. xlvi, emphasis in original)

Haraway's account of how the concept of *diffraction* is moving across scholars is illustrative of how entangled I have experienced the writing of this dissertation to be. It is also illustrative of how concepts move across time and space, taking up slightly different meanings and doings. When thinking with Barad and Haraway, and when reading the stories diffractively through their work, I have found that some key quotes keep popping up in my text. Rather than rebutting these attempts to catch my attention, I have used these quotes as opportunities to re-turn, as in turning over and over again (Barad, 2014), to the same words and to find other ways of making them work.

My love (yes, it is a kind of love, an immediate, physical feeling of belonging and lust) for the agential realism developed by Barad opened the door to a complex theoretical landscape of feminist new materialist and posthuman theories. While reading and writing, I have tasted and tested and thought with a broad range of scholars. Some of these explorations resulted

in quite large chunks of text that eventually did not make it into the dissertation as sentences or references. But they still linger as part of the process that is temporarily congealed in the text you are reading.

Of the scholars that have influenced me beyond what is traceable in the references, Rosi Braidotti must be mentioned. I attended her summer school in 2020, I have read her work alone and in a reading group, and, for a long time, Braidotti's critical posthumanism, especially the notion of the nomadic subjectivity (Braidotti, 2013), were a part of this dissertation. Although the process of doing inquiry moved the dissertation in other directions, Braidotti's work still lingers.

I also owe a huge dept to Vivienne Bozalek, Alecia Youngblood Jackson, Liza Mazzei, Karin Murris, Jayne Osgood, and a number of other scholars who have read and written with Barad, Haraway, and other feminist new materialist and posthuman scholars. I also owe a huge dept to feminist scholars, most notably Sara Ahmed. I have referenced their publications where appropriate. But their work has also contributed in ways not visible by tracing references. By reading their work, my thinking has moved in profound ways. One example of this is the many times I have read a text engaging with parts of Barad's texts and then gone on to read Barad with the other scholar's work also working with me. This process often materialized in the dissertation as a reference to Barad although the thinking and writing of other scholars also were important parts of it.

Another example is the times when texts I have read, and maybe half forgotten or not properly understood the first time I read them, have sparked thoughts months, even years, after reading them. Sometimes, these thoughts have disguised themselves as my original ideas. I have been on the lookout for those occurrences, and I hope most of the entangled ideas that made it into the dissertation also have their appropriate references attached. But there is bound to be some that I have missed. Thus, I want to acknowledge this entangled way of reading, thinking, and writing that is not always visible by looking at who is cited.

A final example of how I have written with others is found in the work that at some point in the process was important but does not fit into the dissertation in its current form. I would like to acknowledge Richerme's book *Complicating, Considering, and Connecting Music Education* (Richerme, 2020) and Ellingson and Sotirin's book *Making Data in Qualitative Research: Engagements, Ethics, and Entanglements* (Ellingson & Sotirin, 2020) as works more important in the process of writing than the count of citations might imply.

I also want to emphasize the importance of my online reading groups. Through regular reading with others, I have learned a lot that I would not have learned if I had been reading alone. The reading group on Barad's texts facilitated by Karin Murris and Vivienne Bozalek has been particularly important in teaching me to read and think slowly, deeply, and in an affirmative and generative manner.

On Not Writing in My Mother Tongue

My mother tongue is Norwegian. Hohti and Truman (2021) argues that the tacit agreement to use English in practically all communication related to academic work has consequences for knowledge production, and that the linguistic privilege of doing research in one's mother tongue should be acknowledged. It used to be so laborious for me to write in English. I would think in Norwegian, translate in my head, and then write, filling the page with red, billowing lines that showed me that I had no idea how to spell in English. While writing, my fingers would attempt to move in the familiar patterns of my native tongue. But through writing and reading and talking in English, this has changed. I feel more at home now. But not totally at home. I am often unsure about the tone of a word (is it too formal or too informal?) and even more nerve wracking than this is that I keep wondering which words I should have been concerned about but missed due to a lack of familiarity with the finer nuances of English writing. English is not, and will never be, my mother tongue.

In addition to Norwegian, my mother tongue could be said to be humanism (St. Pierre & Pillow, 2000). The world I read and talk and write within is deeply entrenched in humanist assumptions. When I first entered the world of feminist new materialism and posthumanism, I felt like I had lost my language. The concepts and words I used to think with evaporated and left me with no words that worked. Although the reading, thinking, and talking I have done since have reworked the language I use into something that I know well enough to write a dissertation, the feeling of having no language to think with has lingered. But I have high hopes that I will, in time, become fluent in these thoughts.

In the reference list, the titles of work in Norwegian and other languages have been translated to English. When not otherwise indicated, I have translated "kulturskole" to schools of music and performing arts. The Nordic letters have been sorted according to the English alphabet: "æ" as "a", "ø" as "o", "å" as "a", and "ö" as "o".

On Writing With Music

English is not my mother tongue, but music is. One intriguing aspect of music is its structure. A piece of music is a phenomenon while the parts of the piece are phenomena on their own. When a chord progression returns to the tonic chord, it feels like it is coming home. The progression has its own identity and function. At the same time, the chord progression is part of a larger phenomenon. When repeated as the last time of many, landing on the tonic chord of a momentous refrain, the chord works in another way than it did when first introduced. Likewise, songs, each one telling its own story, could be part of an album telling another story. And movements of classical symphonies have their own structure with a beginning and an end while also functioning as the beginning or end of the larger work. I have tried to keep my understanding of musical structures in mind when writing this dissertation by paying attention to how the parts of the text are both parts of a larger phenomenon and phenomena on their own. Thus, I have endeavored to write in such a way that each chapter has a life of its own with its own structure, aims and objectives, while also forming a part of the dissertation.

There are also other ways of thinking of musical and textual structures than those found in pop music and classical music. In some of the old Norwegian folk music played on instruments such as the Hardanger fiddle, an instrument that played an important role in me becoming a violinist, there are no separate parts with clearly defined beginnings and endings. Rather, there are short musical motifs linked together. The last couple of notes of one motif might also function as the first couple of notes of the next, creating chains of motifs that often provide the player, listener, or dancer with several possible ways of understanding the structure (Kvifte, 2000; Omholt, 2009). These motifs are different but not in the binary way of conceptualizing difference. They are "not opposed to sameness, nor synonymous with separateness" (Trinh, 1991/1997, p. 416).[15] These musical motifs could be understood both as unbroken strings of moving musical material *and* as interlocked chains. Although there could be pedagogical reasons for teaching motifs as separate entities to an apprentice or student, they are both separate and entangled at the same time in the contexts of playing, dancing, and listening (Kvifte, 2000; Omholt, 2009).[16]

I have tried to keep this way of structuring music in mind when writing, in particular when writing the chapters where I tell stories and read them diffractively through theories. Thinking of the parts of the text as interlocked chains where the end of one part is also the beginning

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15   This understanding of difference is an important part of the feminist theories I think with and, in particular, the diffractive research practice developed by Haraway and Barad.

16   An example of old Norwegian folk music can be found here: https://youtu.be/yM16XzwT8Vg The player is Haldor Meland, a friend of my great-grandfather. In the next chapter, I discuss how a Hardanger fiddle made by my great-grandfather first set me off on the journey of becoming a music education researcher.

of the next generates possibilities for thinking that are not directed toward coming to the end of an argument in order to win (which is a rather colonial and violent form of writing).

Thinking of musical structures when writing also allows for repetition and re-turning (Barad, 2014) in ways attuned to the understanding of difference and sameness as not opposed to one another. "The same" text or story is not doing the same work when placed in a different context. A musical example is found in the song "betty" by Taylor Swift. The chord progression of the song is repeated 12 times. But the cords are not doing the same work each time they are repeated. The feelings they evoke and the way they work with the melody, the lyrics, the instruments, and the voice of Taylor Swift are changing. The quotes by Haraway and Barad that are repeated throughout this dissertation and used in many of the texts I have read, work like this chord progression. They are the same and not the same.

On Writing With Conventions

Like musical genres, genres of texts have their own set of norms. Some of these norms are articulated in templates and policy documents provided by the Norwegian Academy of Music, and I have diverged from them in two ways. First, when the texts contain dialogue, descriptions, feelings, and affects—in short, when the text tells a story—the first line of a paragraph is indented. I separate these texts from the more traditional academic texts with • • •. Second, I have diverged from the template given by not numbering the subheadings of each chapter. I have done this to avoid an emphasis on the hierarchical structure of the text. There are of course hierarchies in the arguments and the development of thoughts found in the text, and the parts of the text do come in a fixed order. But, in line with the performative worldview, I think of the hierarchies of the text as becoming, not pre-existing, and I encourage you as the reader to experiment with the order in which you read the text.

The Structure of the Dissertation

Although I encourage a nomadic reading of the dissertation, I have placed the chapters in a fixed order. Chapter 1, the chapter that is almost at its end, introduces the dissertation. Chapter 2 asks what we can learn by reading music education research through feminist new materialist and posthuman theories, what differences emerge, and how they matter. It also situates the study within the practices of Norwegian SMPA, and it situates me as a former SMPA student and present SMPA teacher and researcher. In Chapter 3, I experiment with the possibilities and impossibilities for doing inquiry created by reading agential realism through affect theory,

intersectional feminism, and Indigenous and Sámi studies. I continue this experimentation in Chapter 4, where I explore the methodology made possible in "the posts" or postmodernism, poststructuralism, post-epistemologies, and posthumanism (Lather, 2016; St. Pierre, 2019b) and in Chapter 5, where I tell how this particular inquiry was done. Together, these chapters form the first half of the dissertation.

The second half of the dissertation contains the diffractive readings that, rather than providing answers, generate four concepts. In Chapters 6 and 7, I read stories from online and face-to-face lessons through agential realism, Sámi studies, and affect theory. This reading generates the concept of *topological togetherness* that offers insight into how the agencies of violin lessons are connected in shifting and becoming topologies of space and time, and into how the spatial and temporal boundaries of lessons are becoming through intra-actions rather than being preexisting containers. In Chapter 8, I follow the strings connecting my violin to colonial and capitalist economies and histories and to the gendered structures of Western music education. In Chapter 9, I investigate the agency of the violins on the lessons. Together, the readings from these two chapters form the concept of *tentacular and agentic violins*. In the following two chapters, Chapters 9 and 10, I read stories of becoming violinists through intersectional feminism and affect theory. These readings generate the concept of *differential becomings*.

In the final chapter, Chapter 12, these three concepts are brought together in the fourth and overarching concept I propose: *knots of knowing-in-playing*. This concept entails the material, discursive, and affective aspects of the knowing, playing, learning, teaching, and being of violin lessons, and it allows for a tracing of the many strings and knots that are becoming within music education. Rather than providing answers, the concept is a tool—an apparatus in Barad's term—for investigating "the particularities of the entanglements at hand" (Barad, 2007, p. 74).

Chapter 2: The Possibilities for Feminist New Materialist and Posthuman Music Education Research

What can we learn by reading music education research diffractively through feminist new materialist and posthuman philosophies? What differences emerge and how do they matter? What possibilities for doing music education research otherwise are created? These are the questions guiding this chapter.

The first part of the chapter is a reading of research related to Norwegian schools of music and performing arts (abbreviated SMPA). This reading introduces the specific context of this study. In the second part of the chapter, I present the small but growing field of feminist new materialist and posthuman music education research. The third part of the chapter is a reading of feminist new materialist and posthuman education research, in particular research associated with the network of PhEMaterialisms and, in the fourth part, I read these research fields diffractively through one another.

Through the diffractive reading, three possible moves for future posthuman music education research emerge: First, a move from research centered on humans—mostly adults in positions of power—and their discourses toward research that also focuses on the children, matters, music, and doings of music education. Second, a move from understanding diversity as a question of who gets access to music education toward also discussing how we might be response-able[17] for the becomings that are made possible and impossible through the education. And, third, a move from theorizing knowledge as an individual and representational trait toward theorizing it as a relational and performative knowing-in-being.

Throughout the chapter, I tell stories from my life as a SMPA student, SMPA teacher student, SMPA teacher, and a PhD student in music education. Barad insists that we are *of* the world, not outside the world (e.g., Barad, 2007; Barad & Gandorfer, 2021). Thus, part of the exploration of the possibilities and impossibilities created in the intersection of music education and feminist new materialism and posthumanism is to explore how I, as a researcher subjectivity that is "differentially constituted through specific intra-actions" (Barad, 2007, p. 342), am *of* the world I do research in. This positioning is also informed by Indigenous scholarship where self-locating, often by telling stories like I do in this chapter, is an important part of carefully

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17   Barad argues that the way quantum entanglements call into question the nature of two-ness "require/inspire a different sense of a-count-ability, a different arithmetic, a different calculus of response-ability" (Barad, 2010, p. 251). In Barad's agential realism, the term response-ability emphasizes the inseparability of "self" and "other" (Barad, 2010, 2014). I expand on this in Chapter 3.

considering how the position of the researcher is a part of the research done (Kovach et al., 2013). The Indigenous perspective, and in particular Sámi[18] onto-epistemologies, will make their reappearance in the chapters to come. But now, let us turn to the Norwegian schools of music and performing arts.

Norwegian Schools of Music and Performing Arts

Although they were originally music schools, SMPA now offer extracurricular education in creative writing, theater, visual arts, and dance as well as music (The Norwegian Council for Schools of Music and Performing Arts, 2016). As a part of a government policy seeking to include all children and youth in cultural activities, SMPA are state funded via the municipalities. The schools offer diverse activities ranging from short introductory courses open to all to highly specialized talent programs with entrance exams. The size and economy of each municipality, as well as its local traditions and cultures, influence the subjects offered, the cost of participation, and the location of the lessons (i.e. in a centralized building or decentralized at local schools) (Berge et al., 2019; Jordhus-Lier et al., 2021). The particular SMPA of this study is located in a large Norwegian city. It offers a broad range of courses and subjects, and the tuition is both centralized and decentralized.

In the following section, I present the literature concerning SMPA in Norway and its historical, social, and economic contexts; curriculum; teaching practices; and teachers, students, parents, and leaders. Although the SMPA of the Nordic countries of Norway, Sweden, Denmark, Iceland, and Finland share many similarities, there are also differences between them. Thus, I focus on research related to the Norwegian SMPA and supplement with research done in the other Nordic countries when relevant. But first, I will introduce some of the entanglements of SMPA, me, and the Norwegian society.

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In 1885, in a small village by one of the many fjords of Western Norway, my great-grandfather Odd Oddson Ystanes was born. He was known as a skilled cabinet maker as well as a keen photographer, playwright, and dancer. Growing up, I took the beautiful things he made, many of them still in our family's possession, for granted. I try not to do so anymore. Most of this dissertation was written while seated in one of the chairs he made. It is a cushioned wooden

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18   As I wrote in the introductory chapter, The Sámi are the Indigenous people of the middle and northern part of Norway, as well as parts of Sweden, Finland, and the Kola peninsula in Russia.

chair with curved armrests. Slightly lower than normal, it is a perfect fit for a not-so-tall woman like his wife, the one he made it for. And for me. While writing, I have often sent my great-grandfather and his skilled hands a friendly thought.

Although, as a child, I took most of what my great-grandfather made for granted, one of the things made by him that often caught my eye was a Hardanger fiddle. Its scroll was shaped like a dragon's head with a golden crown; its fingerboard was covered with an intricate pattern of ebony and mother of pearl; and its body was decorated with ink drawings of traditional Norwegian flower patterns.[19]

When my mother deemed me old enough and careful enough to be allowed to hold the fiddle, I immediately wanted to learn how to play. But my arms were too short for a full-size instrument. In the 1980s, there were no smaller Hardanger fiddles available (now there are), nor did my small local community have any music schools. But when making inquiries in the local folk music scene, my parents learned that a young Chinese violinist had recently moved to our village and started to learn the Hardanger fiddle. Maybe he would take on a student?

My first violin lessons, and I think the first lessons my teacher gave as well, were held in his living room right before dinner time. The room slowly filled with the scent of the Chinese food his wife cooked as we played. Each week, I got a new page of sheet music, copied from my teacher's copy of *Suzuki Violin School, Volume 1*.

My teacher was kind and gentle, teaching first by demonstrating and moving my hands, and later, as he learned to speak Norwegian, with strange metaphors I now realize must have been direct translations from Chinese proverbs. He played with a beautiful tone and quick fingers, he would draw small pictures at the top of the sheet music to remind me of bending my thumb, and he could play all the great pieces that I only knew from recordings.

When my municipality established a music school and my teacher got a position as a violin teacher, my weekly lessons were moved to the elementary school where I studied. On Tuesdays, the day of my lessons, I always miraculously got well from any cold that might have prevented me from going to school earlier that day. I used to arrive early to stand outside the door and listen to him practice.

Although my arms grew longer and I sometimes played folk tunes on the Hardanger fiddle, the violin became my instrument, and I became a violinist.

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I became a violinist because I wanted to. It was my outspoken intention from the age of 13 and an unspoken dream many years before that. But I also became a violinist through the entangled intra-actions of a beautiful Hardanger fiddle, the welfare state of Norway establishing

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19   A photo taken by Odd Oddson Ystanes of a similar fiddle can be found here: https://digitaltmuseum. no/021017408404/fele

music schools, the Chinese revolution causing my teacher to seek a another life in a country across the globe, my parents' network and their willingness to make inquiries into how I could learn to play the violin, my great-grandfather's ability to turn wood into beautiful things, my family's wealth that allowed us to keep my great-grandfather's creations for generations, and a number of other human and nonhuman agencies. In the following section, I explore some of these entanglements through the research done on SMPA.

The Development and Current Status of SMPA

My teacher's history of fleeing from China and creating a new life in Norway, the current climate crisis, the COVID-19 pandemic, and the Russian attack on Ukraine remind me that I should not take the continued stability and prosperity of Norwegian society for granted. But, for the time being, the overall impression of Norwegian society is that of a homogenous, stable, and wealthy society (Thuesen et al., 2022) even though the economic inequality has increased in recent years (Aaberge et al., 2021). One of the fruits of this stable and wealthy society is the development of municipal schools of music and performing arts.

In Norway, music conservatoires and private music schools were, to a large degree, established within the same institutions before splitting up in the 1960s when the first municipal music schools were established (Berge et al., 2019). These first music schools were firmly rooted in a Western classical music tradition (Karlsen & Nielsen, 2021). In 1981 there were 180 municipal music schools with 45,000 students enrolled (NOU, 2013). A change in the funding model led to an increase in the number of schools from 1984 onward (Berge et al., 2019). It was during this period that my local SMPA was established, and I became a student. In 1997, the schools became statutory (*Norwegian Education Act, 1998, § 13–16*). In 2003, the government funding stopped being earmarked for the schools, and the national fee limit was removed. This led to a larger variety of costs and waiting lists (Rian, 2019).

Presently, almost 100,000 children, about 13% of all elementary school students, attend SMPA (Berge et al., 2019). There are also about 50,000 children who attend bands, orchestras, and choirs led by SMPA teachers or who participate in activities organized in cooperation between elementary schools and SMPA (Rian, 2019). Twenty thousand children are waiting to be admitted (Berge et al., 2019). Both the percentage of students enrolled in the schools and the size of the waiting lists vary to a large degree between the municipalities (Berge et al., 2019).

Municipalities provide 75% of SMPA funding while 22.3% comes from student fees. The average fee per year is 3,046 NOK[20], but the fees range from approximately 400 NOK to

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20   This would be approximately 295 USD or 285 EURO in October 2022.

13,000 NOK. Although 39% of the SMPA reported to offer slots for free, only 1% of the users reported that they do not pay. Reduced fees for siblings are found in 75% of the schools (Berge et al., 2019). There is some economic cooperation between private foundations and the SMPA. Half of the SMPA apply to sponsors for funding, mostly to buy new equipment or to fund specific projects. Principals from these SMPA reported that such funding makes up 4.6% of their budget (Berge et al., 2019). This suggests that sponsors do not make a large contribution to the SMPA economy.

As this overview shows, the music and performing arts schools are, to a large degree, publicly financed as part of a government policy seeking to include all children, but there are great differences among the municipalities regarding participation fees, number of available places, and the tuition offered. In the following section, I turn to the activities offered within the schools and the teaching, learning, and playing done there.

Teaching, Learning, and Playing in SMPA

The students of SMPA are supposed to learn something. But what? Who decides what they are to learn and how they are to learn it? The first curriculum framework guiding the content of the schools was developed in 1989, about the same time as I started learning the violin. Since then, two more curricula have been introduced. Although given considerable attention by researchers, "the curriculum framework's actual power as a governing document might, at best, be fragile" (Ellefsen & Karlsen, 2020, p. 283), and the teachers at the schools have considerable freedom to select repertoire and modes of instruction (Nielsen et al., 2022). My teacher taught me the same repertoire that he had learned himself. I often turn to the same songs when teaching my students. This aligns with research saying that local circumstances, traditions, and patterns of musical preferences among the population, as well as teacher competence, affect the instruments and genres offered in SMPA (Berge et al., 2019; Jordhus-Lier et al., 2021).

When it comes to teaching, learning, and playing, there is a lack of research that centers the students and their experiences. The research I have found relies on several surveys and interviews with leaders and teachers, some analysis of the curriculum, and one analysis of textbooks. I have found no studies that observe lessons or asks students about their experiences. Next, I refer to research on SMPA repertoire and activities, on SMPA teachers and leaders, and on SMPA in cooperation with other institutions. Then, I turn to the SMPA curriculum and to how the pandemic affected SMPA.

SMPA Repertoire and Activities

The subject of music is offered in almost all SMPA, and it is the dominant subject in the schools. Most of the schools offer tuition in the genres of Western classical music and pop music, and lessons in Norwegian folk music are offered in about half of the schools (Jordhus-Lier et al., 2021; Rian, 2019). The repertoire played by the students encompasses a wide range of musical genres and styles, but various styles of popular music predominate (Nielsen et al., 2022).

The subject of Sámi folk music is difficult to trace in the literature. One survey includes Sámi folk music in the category of "other genres" (3.6%) and states that Sámi folk music is most frequently offered in municipalities located in Northern Norway (Jordhus-Lier et al., 2021). Another survey does not mention Sámi folk music, but the genre might be included in the category "Folk – ethnic," which is offered in 8.8 % of the schools but not in any of the school's talent programs (Rian, 2019).

Violin, the instrument I play and that is taught in the stories I tell later in this dissertation, is offered in 66% of the schools making it the most popular classical instrument after piano, guitar, and voice. One third of the schools have a string orchestra (Jordhus-Lier et al., 2021).

The average length of lessons is less than 30 minutes, most music lessons are given individually or in smaller groups, and almost all students participate in performances for an external audience. Most of the students stay in the school for three or four years, while 35% stay for five years or longer (Bamford, 2012). Music teachers said SMPA students should develop musical ability, general aesthetic awareness, and self-confidence (Bamford, 2012) along with a healthy and efficient playing technique, music reading, and the ability to play musically alone and together with others (Fjeldstad, 2017).

When I started to learn the violin, my teacher provided me with copies from the textbooks he had played himself as a student. According to Blix (2018), textbooks are an important part of the teaching and learning in SMPA, especially for beginners. By analyzing 26 textbooks for 15 different instruments commonly used in SMPA, Blix (2018) shows that the frequently used textbooks are quite similar in layout, content, and the presentation of the teaching material. She argues that the exercises focus on techniques of practice or control with little emphasis on critical and creative thinking.

SMPA Teachers and Leaders

Almost all teachers in SMPA have formal music and pedagogical competence. It is most common to have a background in art music/classical music (75%), while popular music (48.3%) and Norwegian folk music (13.9%) are also quite common. The number of teachers

specializing in Sámi music is too low to be reported (Nielsen et al., 2022). Some teachers are specialists in one instrument and one musical genre while others are more versatile and adapt the repertoire to the student's interests (Jordhus-Lier, 2018). Although the teachers' competency in general is very high, some principals expressed a need for adjusted and strengthened competence in order to meet the increased emphasis on social aspects found in the curriculum (Rønningen, 2019).

Between 80% and 90% of SMPA teachers work part-time (Berge et al., 2019; Rian, 2019; Taule, 2017). In a survey answered by 151 teachers, the teachers reported to work between 4% and 83% of a full position showing the variety of positions offered (Nielsen et al., 2022). The teachers reported being more unsatisfied with their part-time employment than other employees in municipalities, and they stated that the working hours or positions offered, not a wish to spend more time with their family, are the reasons for working part-time (Nicolaisen & Bråthen, 2012). The high level of part-time employment might also be connected to the dual identity of being both musician and teacher as many SMPA teachers also make a living as musicians (Berge et al., 2019). About half of the teachers at SMPA are men (Berge et al., 2019). I haven't found any numbers indicating the gender balance related to different subjects or instruments.

SMPA teachers are subject to research concerning their subject positions (Jordhus-Lier, 2018), professional knowledge (Aglen & Karlsen, 2017; Waagen, 2016), professional identities (Angelo, 2012a, 2012b, 2015; Angelo & Kalsnes, 2014; Hellandsvik, 2021), professional development (Nielsen, 2012), and educational backgrounds (Aglen & Karlsen, 2017). There is research done on SMPA leaders and their scheduling of timetables (Hauen & Emstad, 2021), and on their cooperation with elementary school leaders (Emstad & Angelo, 2019, 2021).

SMPA in Cooperation With Other Institutions

Within their municipalities, SMPA cooperate with a broad range of institutions, organizations, schools, kindergartens, and local associations and businesses. The goals of the cooperation include recruitment from a broader variety of students, cost efficiency, creating possibilities for the students to perform for a "real" audience, and professional development for the teachers (Emstad & Angelo, 2017, 2021). When SMPA cooperate with institutions offering social and health-related services, the goals of the cooperation often include to enhance quality of life and inclusion into the local community, and the students taking part in the cooperating are more often termed "users" than "students" (Emstad & Angelo, 2021).

Elementary schools and SMPA are expected to cooperate (The Norwegian Council for Schools of Music and Performing Arts, 2016), but there are relatively few SMPA with close connections

to elementary schools (Berge et al., 2019). The cooperation might be guided by a focus on the local community's values, the students and their musical development, or the student's own youth culture (Emstad & Angelo, 2017). Teachers working in both schools need to be able to navigate a broad range of students, group sizes, learning goals, and evaluation policies (Westby, 2017). Research on the cooperation between the schools has investigated projects where teachers from SMPA teach music in the schools (Balsnes & Christensen, 2021; Bandlien, 2021; Hauge, 2021; Rønning, 2017; Strand, 2021) and more informal forms of cooperation where one or more teachers work both in the local school and in the local SMPA (Angelo, 2012b).

In many local communities, there is an established practice in which parent-led choirs, string orchestras, and wind bands buy hours of tutoring and conducting from the SMPA. The SMPA are the formal employers of the teachers, and the cost of the working hours is subsidized by the municipality. The extent of this practice varies from municipality to municipality. In Norway, as a whole, approximately 200 person-years are sold to choirs, orchestras, and bands (Berge et al., 2019).

SMPA are cooperating across the municipalities or with higher music education institutions to prepare their students for higher arts education (Rian, 2019). This is described in the curriculum as part of the Depth program (The Norwegian Council for Schools of Music and Performing Arts, 2016). There are also two junior conservatory programs in Norway for students aged 13 to 18. These are located in the six largest cities of Norway. In Oslo, the capital of Norway, there is an elementary school offering additional music classes for students aged 10 to 15. These institutions cooperate with their local SMPA to various degrees (Johansen, 2018; Stabell, 2018).

Curriculum Framework for Schools of Music and Performing Arts: Diversity and Deeper Understanding

Most SMPA in Norway have volunteered to align their teaching with the advisory curriculum called *Diversity and Deeper Understanding* (The Norwegian Council for Schools of Music and Performing Arts, 2016). This document articulates the aims and values of SMPA as well as the learning goals of the three programs: the Breadth program, the Core program, and the Depth program. The main intention of the Breadth program is to realize the vision of a SMPA for all through outward-reaching activities. The Core program offers long-term training for dedicated students. It also functions as a preparation for the Depth program in which students with special aptitudes, qualifications, and interests get an increased class load and subject material that might qualify them for higher arts education. The curriculum also introduces syllabi for the five disciplines of dance, music, creative writing, theatre, and visual arts. Each

of them have subject specific content, working goals, and objectives across the programs (The Norwegian Council for Schools of Music and Performing Arts, 2016).

Discourse oriented analyses of the curriculum have been used to investigate the unclear definition and use of the concept "artistic quality" (Letnes, 2020; Østern, 2017), the different understandings of knowledge in music (Ellefsen, 2017), the discourses of breadth and depth (Jordhus-Lier, 2018; Jordhus-Lier & Stabell, 2017; Karlsen & Nielsen, 2021), the meanings of the terms "diversity" (Ellefsen & Karlsen, 2020) and "assessment for learning" (Vinge & Westby, 2021), and how the framework constructs a dichotomy between Western classical music and popular music favoring the former over the latter (Karlsen & Nielsen, 2021). A finding shared by most analyses is that the curriculum contains multiple and partly conflicting discourses. I have found no research on how or to what extent the curriculum is playing a part in the practices of the school.

The COVID-19 Pandemic and Online Lessons

In the spring of 2020, all Norwegian schools, including SMPA, had to move all lessons to online platforms to prevent the spread of COVID-19. After a short period of eased restrictions allowing for face-to-face teaching, the second wave of the virus hit in the autumn of 2020 and led to another period of lockdown and closed schools (NOU, 2022). Hodges et al. (2021) warn against likening impromptu online teaching in response to COVID-19 restrictions with online teaching initiated by pedagogical needs. To help distinguish between these two situations, they suggest the term "emergency remote learning" for the teaching circumstances required during lockdowns. Although bearing the extraordinary circumstances in mind, I use the term "online lessons" in this dissertation to refer to the lessons held synchronously in online meeting rooms.

There is one report investigating SMPA during the period of social lockdown (Berge et al., 2021). It states that less than half of SMPA teachers had used digital tools in their lessons before the pandemic and that there were no systems for sharing experience or competence nor for supplying teachers with digital tools like phones or tablets. Despite this, almost all teachers were teaching online and 88% of students participated in online lessons a couple of weeks after the first lockdown. Teachers were given a large degree of freedom to explore different solutions, and they went to great lengths to accommodate students' needs in their teaching (Berge et al., 2021).

The teachers experienced online teaching as more demanding and stressful due to bad sound, light, and image quality; asynchrony between sound and image; internet latency; low-quality Wi-Fi; and trouble finding good camera angles. These challenges were acutely felt in ensemble

teaching. Some students found it convenient to be taught in their homes while others had trouble finding the space for their activities or felt they were disturbing family members by playing. A general perception is that online teaching is better than no teaching and that the effort was appreciated, but that it is not a sufficient or long-term solution (Berge et al., 2021).

After this overview of research on SMPA repertoire and activities, teachers and leaders, SMPA in cooperation with other institutions, the SMPA curriculum, and how the pandemic affected SMPA, I turn to the often used, but seldom defined, term of diversity.

Diversity in SMPA

In the context of SMPA, the concept of diversity has gained an increasingly important position in policy documents. The meaning of the term has recently shifted from ensuring the representation of cultural and artistic expressions across high- and low-brow distinctions, urban and rural contexts, socioeconomic differences, and gender to emphasizing "ethnic diversity" or "ethno-cultural diversity" (Ellefsen & Karlsen, 2020). Analysis of diversity in music education does not only draw attention to who is included and excluded but also to the norms of diversity and how it is considered a value that we should be committed to (Kallio, Westerlund, et al., 2021). One example of how diversity is considered an important value shared by all while also being ambiguous and holding multiple meanings is that the previous SMPA curriculum is titled *On the Way to Diversity* (The Norwegian Council for Schools of Music and Performing Arts, 2002) without defining or even mentioning the term in the body text (Karlsen & Nielsen, 2021).

The title of the current curriculum is *Diversity and Deeper Understanding*. According to Ellefsen and Karlsen (2020), "diversity" takes on four different meanings in the curriculum. It is understood as diversity of educational opportunities and modes of expression. This aspect of diversity is taken up by researchers as investigations of the repertoire, instruments, and genres offered (e.g., Jordhus-Lier et al., 2021; Nielsen et al., 2022). Diversity is also understood as diversity and/or as deeper understanding. The tension between diversity and deeper understanding has been investigated from the perspective of teachers' professional identities (Jordhus-Lier, 2018, 2021a). Another meaning of diversity identified by Ellefsen and Karlsen (2020) is that of diversity of learning arenas and contexts. This understanding is connected to entrepreneurial expectations. I have found no further research concerning this subject in an SMPA setting.

Although diversity holds several different meanings in the curriculum, the most prominent is that of difference in students' ethno-cultural backgrounds (Ellefsen & Karlsen, 2020). I write

from an agential realist perspective that cuts across the divide of society as strictly economic or purely social and of bodies as either biologically or culturally constructed. Rather, class, race, ethnicity, and other social categories are understood as "a dynamic variable with integral cultural, ideological, and discursive dimensions that does not diminish, but indeed is necessary to, a thoroughgoing analysis of economic capital in its materiality" (Barad, 2007, p. 226).[21] Thus I approach research related to the understanding of diversity as that of differences in ethno-cultural backgrounds from a perspective that include questions of race, gender, class, and ability. In music education research, such topics are often referred to as questions of social justice.

Diversity and Social Justice

Music education, alongside education in general, is thought to be beneficial for the individual and the society. Thus, the question of who gets to access music education is considered important, and SMPA aim toward a vision of being for all (The Norwegian Council for Schools of Music and Performing Arts, 2016). But attendance of the schools is stratified along lines of race, gender, and class (e.g., Berge et al., 2019; Jeppsson & Lindgren, 2018; Karlsen & Nielsen, 2021). The many partly overlapping and partly conflicting views on the distribution of and accessibility to music education is articulated by Jääskeläinen as equality, equity, and justice.

> *Equality* in a society can be considered as a state in which everyone benefits from the same supports through equal treatment; *equity* as a state in which everyone gets the support they need; and *justice* as a state in which any causes of inequity are addressed and removed. (Jääskeläinen, 2021, p. 7)

Thus, the term social justice is connected to the aim of addressing and removing the causes of inequity. In music education, social justice is often used as "a catch-all expression and a political call to action" (Benedict et al., 2015, p. xii), and it is used by scholars aiming to ameliorate social problems relating to a broad range of issues (e.g., Bergonzi, 2015; Bradley, 2007; Darrow, 2015; Lamb & Dhokai, 2015). Although there is a general agreement on the importance of social justice, what it means and how to practically achieve it become more fraught the closer one comes to the practice of music education (Jorgensen, 2015).

The dominant theory of social change is built on the premise that in order to change the world, we must first reveal the problems and expose the contradictions, then describe alternatives, and, finally, do things differently (Rosiek, 2021). Following this logic,[22] I might divide social

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21   Chapter 3 offers a thorough engagement with agential realism and its concepts. In Chapter 11, I read stories from violin lessons through the agential realist understanding of race, gender, and class and through intersectional feminism.

22   This linear and humanist perspective on social change is supplemented by the agential realist term response-ability (Barad, 2010, 2014) in the second half of the dissertation.

justice-oriented research into two strands: The first is the act of making injustices visible. The second is the act of developing and describing ways of doing education differently.

There are several reports investigating and making visible the barriers for participation in SMPA. In a report on SMPA in the five biggest cities of Norway, Bjørnsen (2012) shows that cost is a barrier but that lack of knowledge of SMPA might be more of a hindrance. In contrast, the report by Gustavsen and Hjelmbrekke (2009) shows that municipalities with a high percentage of families with a low income have lower rates of participation in SMPA, and that discounts and the possibility for free participation contribute to higher levels of participation. Another barrier might be the demand for parental involvement in SMPA. Parental involvement was reported by 90% of SMPA (Bamford, 2012) and having one or more parents involved in the arts increases the chance of being a SMPA student (Jeppsson & Lindgren, 2018).

The literature aimed at developing and describing ways of doing education differently focuses on projects directed toward including marginalized groups of youth in cultural activities such as Fargespill (Kvaal, 2018, 2021; Schuff, 2016; Solomon, 2016) and El Sistema (e.g., Bergman & Lindgren, 2014; Kuuse et al., 2016; Lindgren et al., 2016; Sæther et al., 2007). These projects are associated with the Breadth program of SMPA. I have found no research that investigates how one might work to enhance diversity in the Core or Depth programs.

Although all societal structures of power are entangled, I make an agential cut in the following section and refer to research related to social class; gender; disabilities; and the often lumped-together categories of race, ethnicity, and cultural diversity in SMPA. As with the research on teaching, learning, and playing in SMPA, this literature centers teachers, leaders, and policy documents. I have found no studies that examine students' experiences of social justice in SMPA.

SMPA and Social Class
The connection between middle and upper social classes and Western classical music is well established (Bull, 2019), and so is SMPA's connection to this tradition (Berge et al., 2019; Jordhus-Lier et al., 2021). Research suggests that middle-class students are overrepresented in SMPA (Jeppsson & Lindgren, 2018). Thus, class is an important social category when discussing diversity and social justice in SMPA. Before moving on to the small body of research on SMPA and class, I give a brief introduction to class in Norwegian society.

There is a large body of work on class in Norway, which defines class and class society in many ways (Toft & Flemmen, 2019). A widely used model is the Oslo Register Data Class Scheme (ORDC) model. It builds on a unique administrative registry of information on all Norwegian

adults born after 1955. The register is compiled from official registers on, for example, income and tax, education and employment, and working hours and occupation. The information is coupled with an individual number, so it is possible to match it against data on education, family, and geographical location (Hansen et al., 2009, 2014; Toft & Friedman, 2021).

Building on the rich data register, the ORDC model utilizes a vertical *and* a horizontal analysis of class based on Bourdieu's theories on different forms of capital (Hansen et al., 2009) such as cultural and economic capital (Bourdieu, 1984/2010). The horizontal distinction relates to the composition of the capital as cultural and economic. Cultural capital might be accumulated through education. It also includes specific tastes, manners, and lifestyles that are recognized in society as legitimate (Hansen et al., 2009, 2014). Furthermore, as Hansen et al. write, cultural capital relates to access to networks that could potentially be mobilized to influence decisions or to secure access to jobs; it also relates to other situations where economic capital might be gained. Economic capital includes income but also other forms of capital like the prospect of inherence or being deemed worthy of gaining a loan (Hansen et al., 2009).

The different forms of capital are interchangeable. Economic capital might be used to gain cultural capital, and cultural capital might give access to circles of high economic capital. Some groups have an equal distribution of economic and cultural capital, and they are considered the professional classes (Hansen et al., 2009, 2014). By paying attention to not only how much capital one has but also to how the capital works and the work the capital does, a complex understanding of the workings of class is made possible. In these workings, music is important as it is one of the most important negotiations of the cultural capital sphere. Patterns of taste play an important role in navigating class society (Dyndahl, 2020), and the lack of the "right" musical and pedagogical capital could reproduce cycles of injustice in music education (Wright, 2015).

Returning to the story of the Hardanger fiddle made by my great-grandfather, I notice how the economic capital of my family—materialized through the many beautiful things, including a valuable instrument we kept for generations as well as my parents' ability and willingness to pay for private lessons—was used to gain cultural capital through my music education. The terms "economic capital" and "cultural capital" also make it possible for me to grapple with my experience as a student in higher music education. When I was admitted into the conservatory, as the first person ever in my family to even think of applying, I met with students who were the second or third generation of classically trained musicians. My parents had used economic capital to pay for private lessons. But some of my fellow students had taken private lessons with the best and most renowned teachers, and they knew how to pronounce

composers' names and how to throw musical terms casually into conversations. They had gained a cultural capital that I did not possess.

In SMPA policy documents, the Western classical tradition is dominant (Ellefsen & Karlsen, 2020; Karlsen & Nielsen, 2021). In literature on the Nordic SMPA, the schools are found to show strong signs of social closure, and they are associated with highbrow culture (Karlsen & Nielsen, 2021). In their survey of 2,413 Swedish sixth graders, Jeppsson and Lindgren (2018) write that the "most important aspect of the cultural reproduction found in this study, however, is the match between the middle-class habitus and the 'CSMA[23]-appropriate habitus'" (p. 206), The study from Sweden is supported by smaller Norwegian studies, which show that the main indicator of participation in SMPA is a parent's level of education (Bjørnsen, 2012), and that children with high socioeconomic status are more often active in SMPA (Andersen & Bakken, 2020). Although there are signs of SMPA reproducing class structures, parents of SMPA students might also view their children's musical education as a tool for social reconstruction and for reclaiming social positions parents had before immigrating to Sweden (Hofvander Trulsson, 2010).

SMPA and Gender

Although Norway is considered to be one of the countries with the highest level of equality between genders, women in Norway have less economic capital and political power than men, and the work force is marked by gendered patterns of occupation and pay (Kandal, 2021). The gendered structures of society are also found in SMPA. Girls make up 65% of the SMPA student body in Norway (Berge et al., 2019), and the schools have distinct gendered patterns of participation in the way either girls or boys dominate particular instruments, genres, and activities (Bamford, 2012; Berge et al., 2019; Blix & Ellefsen, 2021; Kjøk, 2008; NOU, 2013).

Although gender inequality has been identified, there has been little interest in discussing ways of removing the causes of inequality on this subject. Gender has not been seen as an important topic of debate by actors such as The Norwegian Council for Schools of Music and Performing Arts, Ministry of Education and Research, or The Norwegian Directorate for Education and Training (Borgen et al., 2010). Nor have I found any signs that SMPA researchers and leaders strive toward achieving greater gender equality. A report by Berge et. al (2019) states that more girls than boys become SMPA students but do not suggest reasons why this is so or how it might be changed. Olav Kjøk, the principal of Oslo SMPA at the time, stated that the main challenge was giving an education to the many children on waiting lists not that their preference of instruments was gendered (Paszkiewicz & Skjong, 2007). There

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23   The term "community school of music and arts" abbreviated "CSMA" is used in this article for the Swedish word "kulturskolan" (Jeppsson & Lindgren, 2018).

is a recent interest in questions of gender in higher music education (Blix et al., 2019, 2021; Blix & Mittner, 2018, 2019; Røyseng, 2021), as well as one recent article on gendered patterns of participation in SMPA (Blix & Ellefsen, 2021). These works raise hope for more research to come concerning how to change gender inequality in music education.

SMPA and Students With Disabilities

Another area of inequality that has been attributed little importance is that of children with disabilities and SMPA. Within music education, disability is often neglected and marginalized in discussions of inclusion and exclusion (Laes & Westerlund, 2018). In one survey, the schools participating reported to have 82,385 students and that 1,304 of them were disabled (Rian, 2019). This would suggest that 1.5% of the students of SMPA are disabled. There are no numbers reflecting the percentage of Norwegian children living with disabilities, but about 15–20% of the adult population are disabled (The Norwegian Directorate for Children, Youth and Family Affairs, 2017). The discrepancy between these numbers suggests that children with disabilities are underrepresented in SMPA. I have found no research relating to how to work toward including children with disabilities in SMPA in the Norwegian context.

SMPA and Race, Ethnicity, and Cultural Diversity

Although diversity holds several different meanings in the curriculum, the most prominent is that of difference in students' ethno-cultural backgrounds (Ellefsen & Karlsen, 2020). The term "ethnic" is, to a large degree, used as a code word for race (Harlap & Riese, 2021) in Norway because the word "race" is considered by many to be taboo and to reinforce racism (Bangstad, 2015). Thus, race[24] is often silenced and elided with concepts such as culture, ethnicity, and biology in contemporary debates and research on education in Norway (Eriksen, 2020; Harlap & Riese, 2021). Still, race is at work. One example of this is how being Norwegian is assumed to mean being white in university settings (Harlap & Riese, 2021). Another is how the term "cultural diversity" in education policy documents and teacher education research works to uphold racialized discourses of Othering and whiteness (Fylkesnes, 2019). Although the concept of race is mostly avoided in educational settings, there are some scholars working with race within a Nordic educational context (e.g., Bayati, 2014; Dowling, 2017; Eriksen, 2020; Fylkesnes, 2018, 2019; Harlap & Riese, 2021) and a growing number of writers and activists such as Sibeko (2019), Joof (2018), and Ali (2018) address issues of race, racism, and racialization in society at large and in education.

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24   Race is a complex term holding several meanings, and it is beyond the scope of this chapter to explore them all. In this section, I pay attention to how it is used in SMPA-related research and how it is connected to the terms "ethnicity" and "culture."

To the best of my knowledge, there are only two articles relating to questions of race in SMPA. Hovde (2021) investigates how music teacher educators experience and perceive practices, values, and significance related to multiculturality and whiteness/white privilege. She identifies a severe lack of knowledge on these issues, which leads to exclusionary structures and practices. A similar finding is articulated by Ulrichsen et al. (2021). They use critical race theory to investigate the gap between good intentions and failing implications in leaders', teachers', and researchers' discussions of how SMPA might become more inclusive.

In the discourses of Swedish policy documents and SMPA leaders, the terms "refugees," "newly arrived," "children with foreign backgrounds," and other related terms are used interchangeably to denote the diverse group of children living in Sweden who were born, or have parents who were born, in other countries (Di Lorenzo Tillborg & Ellefsen, 2021). I notice a similar tendency in Norwegian policy documents and research where race and ethnicity are engaged with through the language of immigration. There is some research that aims to identify problems related to social justice and race, ethnicity, and cultural diversity. This research finds that children who are immigrants or born to immigrant parents are underrepresented in SMPA both in Norway and Sweden (Jeppsson & Lindgren, 2018; Kleppe, 2013; The Swedish Arts Council, 2021). This underrepresentation is recognized by policy makers, and the inclusion of refugees and immigrants in SMPA is a priority by the Norwegian Council for Schools of Music and Performing Arts (2017). But Ellefsen and Karlsen (2020) point to the potential harm in "ethnification" of groups and their culture as it might assume a uniformity of ethnicity and culture both in the marginalized and dominant groups, as well as effectively obscuring other sources of social inequality and of intersecting demographic categories.

The Sámi are the Indigenous people of Norway as well as Sweden, Finland, and Russia. Sámi culture is mentioned in the curriculum, but I have found no research on Sámi culture in Norwegian SMPA. In an analysis of the Finnish curriculum, Koskela et al. (2021) found that the 2004 curriculum positioned Finnish culture as a solid and unified entity and Sámi students as being an "Other," while the 2014 curriculum position diversity as a value and inherent trait in both Finnish culture and within each student, and it emphasized the need to bring up the importance of the Sámi culture. Although there is no analysis of the position of Sámi culture in the Norwegian curriculum, it states that "Sámi children and young people in relevant areas should be able to maintain and develop their culture within the community" (The Norwegian Council for Schools of Music and Performing Arts, 2016, p. 24). This suggests that Sámi culture is positioned as something other than the culture generally taught in SMPA and, thus, that the current Norwegian curriculum might share the position on these questions with the Finnish curriculum from 2004.

In this first part of the chapter, I have read and discussed research on SMPA, and I have told parts of the story of how I became a SMPA student myself. I now move on to the small, but growing, body of feminist new material and posthuman music education research.

Emerging Feminist New Materialist and Posthuman Music Education Research

When I first started wondering what feminist new material and posthuman music education research might look like, I did not know that there were scholars already working with this. But there are! There are some music scholars engaging with feminist new materialist and posthumanist theories, both in and outside of the Nordic countries. In the upcoming section, I engage with this emerging body of literature.[25]

But before engaging with posthumanist music education research, I tell a story of how I—not as a rational and individual subject, but as an entangled and becoming subjectivity (Barad, 2007)—came to be situated in the intersection of music education and posthumanism.

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I don't remember when I first decided I wanted to be a violinist, but I remember the first time I uttered my dream out loud, at the age of 13.

By the age of 24, I had studied music for years. I had done many auditions with and without success, and I had spent unspeakable numbers of hours in rooms dedicated to individual music practice. These were always the same: small rooms with unparalleled walls to prevent the sound waves reflecting back and forth, a mirror on the wall with doors you could close on the days you couldn't stand to look at yourself, and a music stand. If I was lucky, there was a window. Maybe even a window that was possible to open.

After my bachelor's degree, I considered applying for a master's degree in music performance. But I soon realized that I would not make it through the entrance auditions. Although

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25   I will not engage with studies drawing on the immanent philosophy of Deleuze and Guattari (e.g., Gould, 2007, 2011, 2012; Jorgensen & Yob, 2013; Richerme, 2020) and the actor-network theory of Latour (e.g., Fenwick & Edwards, 2010; Ferrante & Sartori, 2016; Leijonhufvud, 2018). Although Deleuze and Guattari as well as Latour share the posthuman interest in the relational and ontological aspects of the world, their work is not built on the feminist tradition that is so important for feminist new materialist and posthumanist scholars. Neither will I engage with music education studies drawing on feminist theories (e.g., Almqvist, 2019; Blix et al., 2021; Gould, 2004, 2011). As I position this inquiry as a feminist and new material and posthumanist inquiry, I limit this reading to research that share this dual starting point.

my playing had improved a lot, the level required was not within reach. I opted for teacher training and the prospect of getting a steady income.

Then life happened. I got married, had two kids, and found that although I loved teaching, working late into the evenings at three or four different schools a week was really hard. To have a breather, I pursued a master's degree in music education while working part-time.

As I sat waiting for a lecture to start, catching my breath after three hours of waking, dressing, and feeding our kids before delivering them to daycare while wading through drifts of snow and already preparing the evening's lessons in my head, Professor Øyvind Varkøy walked in. He looked relaxed. He held a mug of steaming hot coffee. He drank his coffee while still warm, and he talked calmly of an interesting topic to a group of well-behaved grown-ups.

I want to have that kind of job! I thought to myself. Of course, the prospect of having a comfortable job where I could drink my coffee while it was still hot was not my only motivation for applying for a PhD position. But it was definitely part of it.

I threw myself enthusiastically into the assigned texts during the first semester as a PhD student. But soon, I grew to resent the readings. The first thing that annoyed me was that the texts introduced me to a world of research dominated by men. Although there were several female professors and lecturers at my institution and among the authors of the papers we read, the theories and concepts they thought with were all coined by dead, white men. Because I had been a feminist since I first read *Egalias døtre,*[26] the male dominance was, although annoying, an easy thing to identify.

The second thing that annoyed me was impossible to grasp at first. It was like an itch. Always there, always moving when I tried to scratch it. There was something about the worldviews I was introduced to in the lectures on philosophy of science—phenomenology, hermeneutics, discourse studies, critical theories—that didn't sit right with me. Although the theories and methods were all different, they gave me the same, itchy feeling. But I didn't have the words or understandings to identify the itch.

"What are contemporary philosophers working on today?" I asked the lecturer who was summing up the readings of the semester. I had just realized that Foucault and Bourdieu, the two youngest philosophers we had read, were the same age as my granddad.

"Oh, I would say that posthumanism is an important strand of philosophy these days," he answered thoughtfully.

This reply set me off on a string of searches in Google Scholar, Academia.edu and similar web sites. I have unsuccessfully tried to reconstruct how those searches led me to the 2003 article "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter" by Karen Barad. But somehow, I ended up reading it during the Christmas holidays of 2018.

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26   *The Daughters of Egalia* in English. The book is written by Gerd Brantenberg in 1977, and I discuss how it is an example of stories that matter in Chapter 4.

Reading is not the right word for my engagement with the text. I let my eyes take in the letters of the printed page while understanding a word here and a sentence there. I could not make the text into a comprehensive argument, and I often fell asleep reading as it didn't make sense at all. But I felt, really felt, that this was my thing. This was my philosophy. I fell in love with the writing of Barad.

• • •

To become a researcher in the intersection of music education and feminist new materialism and posthumanism was not a purely rational decision made by me alone. It was, and still is, an entangled becoming involving a multitude of agencies such as the working conditions of SMPA, the steaming hot coffee and the comfortable life it symbolized for a working mum used to inhaling lukewarm coffee on the go,[27] and the algorithms of search engines. My first reading of posthumanism, the Barad article I mentioned, was more of an affective rather than an intellectual experience. I read it with love (Youngblood Jackson in Tesar et al., 2021). My use of the word "love" is intentional. Love might have connotations of being irrational, of not having a place in research. But that is a residue of anthropocentric and humanist thinking that glorifies the rational, autonomous subject (Braidotti, 2013). Love, enthusiasm, joy, playfulness, or any other energizing or motivating affect is crucial when taking up an endeavor that requires hard work. It was love of music that made me practice for hours day in and day out, and love for thinking with posthuman theories that drives me when doing this inquiry. Luckily, I am not the only researcher to find posthumanism exciting to think with when doing music-related research.

The first three Nordic publications relating to posthumanism and music that I know of were published in the 2010s. In her master's thesis, Hermansson (2014) develops a posthuman aesthetics of music. Posthuman perspectives are also used to discuss the use of iPads in musical activities in a preschool (Holmberg & Nilsson, 2014) and circus teaching in SMPA (Østern & Moxness, 2017). From the 2020s, there has been a growing number of publications discussing posthuman music education research. Espeland (2021) argues that the interest in matter and relations has been present in music education research for a long time, but he suggests that "we"—referring to music lovers, performers, teachers, and researchers—might

> have focused too much on the human-to-human actions and interactions, and
> on cultural and social aspects of learning and education, and not enough on the

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27   My idealized image of professorial life has since been nuanced by lived experience and by the scholarship on being female and/or a mother in the academy (e.g., Ahmed, 2012, 2017; Coleman & Osgood, 2019; Osgood et al., 2016).

significance for musical learning and understanding of the intra-action and interaction of things, physical environments and human beings. (Espeland, 2021, p. 233)

Espeland is one of the most established and renowned music education scholars in Norway, and it might seem like his interest in new materialist and posthuman perspectives is part of a trend in music-related research. In the neighboring field of music therapy, posthuman perspectives are also emerging. Ansdell and Stige (2018) pose the question of whether music therapy could still be called humanist, and Ruud (2020), a leading scholar in the field of music therapy, builds his most recent book on posthuman thoughts, in particular the work of Deleuze and Guattari.

In recent Norwegian SMPA-related research, there is a growing interest in feminist new materialist and posthuman theories. Hauen and Emstad (2021) use a vital materialism inspired by Braidotti and Deleuze to examine the rhizomatic nature of SMPA. In the same book, Fretheim and Fosshei (2021) also employ elements from Deleuze and Guattari, mentioning Barad in passing, when examining their experiences from an interdisciplinary music and literature teaching concept using duoautoethnography. Ulrichsen et al. (2021) use the research practice of diffraction to show a discrepancy between the general intentions of inclusion and the practical outcomes in SMPA. Also using diffraction and the theories of Barad, Jusslin and Østern (2020) explore the collaboration of a dance teaching artist and a researcher working with fifth graders. Jenssen and Martin (2021) aim to bridge duoethnography into pedagogy drawing on, among others, the work of Barad. In another article, Jenssen (2022) explores voice lessons and the notion of "voice" through thinking with, among others, Braidotti. There are also a growing number of PhD dissertations in music education, music performance, musicology, and related fields in the Nordic countries that are thinking with posthuman theories (Bjørkøy, 2020; Jonasson, 2020; Øvrebø, 2021). A special issue of the Journal for Research in Arts and Sports Education exploring post-approached to education and the arts (Jusslin et al., 2022) published weeks before I submitted this dissertation adds to this growing trend by a number of articles drawing on the theories of, among others, Barad and Haraway.

Although it is growing, the field of posthuman music education research is characterized by a certain hesitancy. The PhD dissertations are, like mine, marked by starting out as a humanist project becoming posthuman along the way. Several are marked by being a first endeavor into the field of posthumanism. With some exceptions (Jenssen, 2021; Jonasson, 2020), the feminism of posthumanism is not explored. This might be related to the generally low attention paid to feminist questions in Nordic music education research.

In the international field music education, there is also a growing interest in feminist new materialist and posthuman thoughts. Interested in the doings of music and thinking with agential realism, Showen and Mantie (2019) argue that "art is a matter of intra-activity where artist, audience, and environment merge in an affective becoming that alters not merely knowledge of the world but the very *matter* of the world itself" (p. 349). The aesthetics of intra-action, they write, involve our capacity not only to touch but also to respond to and be transformed by touch. Furthermore, agency is transformed from something an individual artist, composer, or listener has to a relational doing, a capacity to be response-able. Thus, Showen and Mantie move music from a purely epistemological matter to an ontological matter where "known" and "knower," as much as "actor" and "acted upon," is inseparable or, in Barad's words, entangled.

Another recent engagement with music and feminist new materialist and posthuman thoughts is found in an article exploring how music, also conceptualized in the article as soundsensing and soundmaking, and the figuration of "child" come to matter in museums (Osgood & Burnard, 2019). The first author of this article is my supervisor who takes part in creating the growing field of feminist new materialist and posthuman education research that is the topic of the following and third part of this chapter.

Feminst New Materialist and Posthuman Education Research

Although the field of feminist new materialist and posthuman *music* education research is emerging, these theories have already gained widespread use in education research. The field of feminist new materialism and posthumanism[28] builds on a broad range of philosophies and areas of study that include poststructuralism, feminism, and critical social studies. Although the field is heterogeneous, educational scholars within it similarly focus on decentering the human subject and turning their attention to matter and its agency; studying ongoing and emerging relations and productions; and taking an onto-epistemological stance that does not view knowledge as representation or knowledge *of* but as relational and becoming (Barad, 2007; Coole & Frost, 2010; Lenz Taguchi & Eriksson, 2021).

In educational research, these thoughts are currently gaining momentum. One materialization of this movement is manifest in the PhEMaterialisms[29] network. PhEMaterialisms draws

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28   Posthumanism, feminist posthumanism, or critical posthumanism, and new materialism or feminist new materialism, are partly overlapping and partly diverging fields of research gathered under the umbrella term "the ontological turn." I expand on this field in the following chapter.

29   Its webpage can be found here: https://phematerialisms.org.

together educational scholars "grounded in a genealogy of poststructural, postcolonial, postqualitative, intersectional feminist, and queer work in education" (Strom et al., 2019, p. 3) and the scholars of the network engage with philosophers such as Deleuze and Guattari, Braidotti, Haraway, and Barad (Ringrose et al., 2020). The PhEMaterialisms network is a theoretical assemblage in itself where "the 'Ph' refers to posthuman thinking and doing; its phonic, 'phem,' refers to multiple feminisms; its 'E' refers to education in the broadest sense; and 'materialisms' comes from neo/new materialist thought" (Strom et al., 2019, p. 3). The researchers associated with the network work with "the *feminist capacities and possibilities* of the theories and methodologies of posthumanisms and new materialisms" (Ringrose et al., 2020, p. 1, emphasis in original), and they aim to put theories and concepts to work "which can better account for the multiple, entangled, ever-shifting, difference-rich nature or processes of teaching, learning, schooling, and activism" (Strom et al., 2019, p. 2).

The researchers associated with the network have published on a broad range of subjects. These include exploring conceptualizations of "the child" in the Anthropocene starting from an assemblage of things such as books, dust, lice, and child (Osgood & de Rijke, in press), or exploring how understandings of childhood are interwoven through connections to gender and heteronormativity, to capitalism, to industrial farming, and to eating or not eating meat—a connection explored through the use of animal figurines (Osgood & Mohandas, 2021). Researchers associated with the network also investigate the multiple positionalities or positionalities-plural as female and feminist academics in higher education (Zarabadi et al., 2019), and they aim to disrupt normative, business-as-usual modes of knowledge production at conferences and in publications (Fairchild et al., 2022). The feminisms of PhEMaterialisms manifest themselves in different ways including in research on the role matter such as Lego (Osgood, 2019), farm animal figures (Osgood & Mohandas, 2021), or swings (Günther-Hanssen et al., 2021) play in children's gendered becomings, as well as sexual harassment in pre-teen peer cultures (Pihkala & Huuki, 2019).

Although the scholars associated with the PhEMaterialisms network are engaged in a broad range of topics and approach them in different ways,[30] they all decenter humans and turn our attention to matter, they study ongoing and emerging relations and productions, and they work with onto-epistemologies rather than separating questions of knowing and being. In reading feminist new materialist and posthuman education research and music education research through one another, their differences and how these differences matter become tangible. It also becomes possible to imagine other ways of doing music education research. In the fourth part of this chapter, I explore these possibilities.

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30   I will engage in-depth with the methodologies of some of these works in Chapter 4.

Future Feminist New Materialist and Posthuman Music Education Research

Dominant conceptions of teaching and learning rely on linear thinking rooted in humanism and its idea of individual and intentional subjects (Strom & Viesca, 2021). These ideas give rise to questions concerning educational research that assume answers will take the form: "Education will make the kind of human who can …" (Snaza & Weaver, 2015, p. 2). In such questions, there are assumptions of education being a human-centered activity. There are also assumptions of a linear logic of progress that takes the human from one state—often the state of being a child—to a better, new state of knowing more and being more like an adult. As I will discuss in detail in the following chapter, Barad's agential realism reworks the human subject into a subject becoming through intra-actions, and it reworks linearity into dis/continuity (Barad, 2007). How, then, might I ask questions about what music education means without assumptions of an individual human striving for linear development? What possibilities for doing posthuman music education research are created by reading music education research diffractively through feminist posthuman and new materialist education research? In the next section, I explore three possible moves that emerged through the readings, and I will relate them to the question of *How are violin lessons enacted and what do they produce?*

From Humans and Discourses to Matter and Doings

Reading music education research through posthuman education research makes tangible the tendency to center humans in music education research. The Human subject with a capital "H" is male, white, and able-bodied. He is an individual subject that self-regulates and rationally progresses toward fulfillment of his capacity (Braidotti, 2013). This humanist conceptualization of the human subject is so dominant that I, prior to reading feminist new materialist and posthuman theories, did not notice it. I simply took it for granted that the center of research was a human subject.

The human-centeredness of music education is so all-encompassing that it is difficult to grasp, also after reading theories decentering humans. One example of a human-centered perspective is found in a definition of music education stating that "music education is centrally concerned with transmitting and transforming a plethora of musical traditions from one generation to the next" (Jorgensen, 2015). Jorgensen, as many other influential music education scholars, assumes that the subject doing this transmitting and transforming is a human being without discussing this assumption or how subjects come into existence.

Although all-encompassing, the anthropocentric worldview becomes easier to grapple with when nuanced and extended. One example of this nuancing is found in the texts of Richerme, a scholar working with the philosophy of Deleuze and Guattari. She argues for a human ontology that is

> constituted by the integration of cognition, embodiment, emotions, and sociality [and that] complicates rather than simplifies our understandings of ourselves, our musical endeavors, and our music teaching. It provides not a fully ordered framework but rather an unsettled chaos out of which new understandings and connections might form. (Richerme, 2015, p. 94)

In her book *Complication, Considering, and Connecting Music Education* (2020), Richerme develops her human ontology on the connections and chaos of music education in thought provoking ways, but her thinking is still centered on the human. Although she contests the idea of a bounded human subject, she proposes a *human* ontology, and her argument takes the *individual human* as the starting point. A similar approach is found in a discussion on assessment in music in which the subject being assessed, the individual human, is taken for granted as having a stable and a priori existence. The skills and knowledge assessed are assumed to be individual although they are influenced by the context (Sandberg-Jurström et al., 2021).

The centering of adult humans in SMPA-related research manifests itself through the many studies interviewing or administrating surveys to humans in their capacity as leaders (Emstad & Angelo, 2017, 2021; Gustavsen & Hjelmbrekke, 2009; Jordhus-Lier et al., 2021; Rønningen, 2019) and teachers (Angelo, 2012a, 2012b, 2015; Fjeldstad, 2017; Hauge, 2021; Jordhus-Lier, 2018; Nielsen et al., 2022). Two surveys involve leaders, teachers, and parents (Berge et al., 2019, 2021; Bjørnsen, 2012). Students are, in the few studies where they are part the research, subjected to teachers' teaching (Waagen, 2016) and evaluation (Fjeldstad, 2017), or they are respondents in a survey (Jeppsson & Lindgren, 2018).

By mainly relying on transcribed interviews or surveys to generate data, researchers primarily focus on words, which are then commonly turned into discourses as many researchers think with discourse-oriented theories. When observation is used as a method, the underlying anthropocentrism turns the researcher's attention toward humans and their words (Waagen, 2016). There is a recent study that nuances this tendency by paying attention to the materials, the room, and the students participating in music lessons held by a SMPA teacher at an elementary school (Bandlien, 2021).

The interest in words also manifests itself in the many, often discourse-oriented, analysis of the curriculum (Ellefsen, 2017; Ellefsen & Karlsen, 2020; Jordhus-Lier, 2018; Jordhus-Lier & Mikalsen Stabell, 2017; Karlsen & Nielsen, 2021; Letnes, 2020; Østern, 2017; Vinge & Westby, 2021). The contrast between the researchers' keen interest in the curriculum and the teachers' lack of the same when choosing repertoire (Nielsen et al., 2022) is worth noting.

The overview of SMPA-related research shows that the field is dominated by research concerning adult humans and their discourses. Humans breaking with the humanist conceptualization of a human subject, such as children, are seldom part of the research. And if they are, they are spoken about by adults or policy documents. There could be practical and ethical reasons for this, such as challenges concerning informed consent. But, as the following engagement with feminist posthuman educational research shows, there are possibilities for engaging with children and their worlds in response-able ways.

Decentering Humans and Exploring Matter, Affects, and Spacetime

One example of research that decenters humans and turns our attention to matter is a paper by Osgood and de Rijke (in press). By assembling bits and pieces such as lice, hair, and dust found down the back of a chair, as well as a book and a child, the researchers use an arts-based, feminist methodology that includes children's drawings, the scribbled-on pages of a book, and collages. By doing this, they explore "what else a book can be, what else a child can be, and what else children's literature studies and childhood research can become" (Osgood & de Rijke, in press, no page number). By not taking the boundaries of educational fields for granted, the authors explore matter and its history, its production, and its connection to colonialism and capitalism. The child that figures in the paper, a child struggling with learning to read, is not the center of the investigation. Rather, she is one of several agencies. Her agency becomes tangible through her drawings and thoughts as she reads and grapples with books together with one of the authors. Although not centered, her presence in the research article is powerful and impactful, and her understandings of the world are presented to the reader in a response-able way.

The feminist posthuman and new material decentering of humans also allows for investigations of how affect works. One example of this is found in an exploration of literacy learning and how sounds, in particular the insistence of silence while reading, work in disciplining students into white affective rhythms (Dernikos, 2020). Another is the exploration of how an affective event in a classroom, that of a female Muslim student being disciplined for reading lesbian erotica, might be connected to larger scale events and geopolitical forces such as the war on terror after 9/11 (Niccolini, 2016).

A third possibility created by decentering the human subject is to explore how time and space are not prerequisites for human actions but intra-acting agencies taking part in educational practices. One example of this is an exploration of how clocks are not only instruments hanging on nursery walls. They are also producers and enablers of clocking practices where clocks, children, and educators intra-act (Mitchell, 2017). Another example is an exploration of teaching as nonlinear and as materially and affectively entangled through time and space; this exploration resists the dominant understanding of temporality as uni-linear and the assumption of spatiality as narrow and fixed (Lambert, 2021).

How Might Matter Matter in Music Education?

As I wrote when welcoming you into this dissertation, the initial driving force behind writing it is the dissonance between the practice of violin playing, learning, and teaching and the music education literature I was presented with as a PhD student. Where were the bows making it possible to play the sixteenth notes? Or the Hardanger fiddle inspiring a young child to take up playing? Where were the smells, the feelings, the fears? The rooms, the timetables, and the ticking clocks?

Education research matters in preparing future teachers for their professional lives. Strom and Viesca (2021) suggest a move in teacher education toward a complex understanding of teacher learning-practice. This understanding enables research that studies how teacher learning materializes in situated and local practices within particular cultural, historical, political, and temporal conditions and with particular materials and languages, and also studies how agency is distributed between human and nonhuman agencies (Strom & Viesca, 2021). In her examination of new teachers' entanglements in time and space, Lambert (2021) suggests the Baradian concept of spacetimematter as a generative supplement to the linear concept of time, and container model of space. Through thinking with spacetimematter as patterns becoming with affects and hopes and memories and all the other things making a classroom lively and unpredictable, new teachers might gain useful insights into the complex assemblage of teaching.

Through research engaging with the complexities of musical teaching, learning, and playing, future teachers might become better prepared to navigate these complexities when teaching. By not taking the humanist human subject as a starting point for research, it becomes evident that other-than-humans—violins, spiders, bows, COVID-19—also are important agencies. To be responsive to and intra-act with all of these agencies is an important part of thriving as a music teacher, and literature used to prepare future music teachers should engage with these questions.

As the reading of SMPA-related research showed, we know little of the doings of matter in SMPA. We know that there are violins in SMPA because we know the number of schools offering violin lessons. But we know little of the violins and their agency. What size are they and how does the size of the violin affect the playing done? How about the quality of the violins? What do different quality violins do to the playing of different students? What about the strings, the bows, the shoulder rests, the music stands, and the sheet music? By exploring how matter matters, we might gain new insight into how music education works and what it produces. This is connected to questions of social justice. Feminist new materialist and posthuman scholars demonstrate how it is possible to broaden the discussion of diversity from questions of (human) access into music education toward also being response-able to the differential subjects and societal structures that music education produces.

From Diversity as Access to Becoming Response-Able for Productions

In music education research, diversity is a complex and undefined term (Ellefsen & Karlsen, 2020) while at the same time an unquestioned value (Kallio, Marsh, et al., 2021). But although undefined, diversity in music education research is most often related to groups of humans and their access to music education. In the reading of SMPA-related research, I connected the literature on diversity in SMPA to social justice-oriented research, and I argued that there are two strands of research: research aiming to make injustices visible, and research aiming to develop and describe more just educational practices.

Both these strands of social justice-oriented music education research are anthropocentric. Although relating to societal structures, they center the individual human: the student, the musician, or the researcher. When Benedict et al. (2015) write that the fundamental issue of socially just musical and educational practices is one of equity, the underlying assumption is that of equity between individual humans. Jorgensen (2015) writes that justice emphasizes the worth, dignity, preciousness, self-respect, and self-worth of individual human beings. Although she suggests a number of overlapping lenses through which to view social justice, they all have to do with aspects of human rights.

There is also research aiming to move toward other ways of engaging with questions of social justice. One example is found in a duoautoethnographic study where Lewis and Christophersen (2021) highlight the situatedness of social justice practices and use their different experiences to create more complex understandings of social justice that engage with the specific situations of the (in)justice. Another is Kallio's (2021) conceptualization of reflexivity as a form of listening that might create "work that generates newly dynamic and relational engagements with meaning-making and experience that require—above all—the transformation of ourselves"

(Kallio, 2021, p. 63). Both of these texts move toward an understanding of social justice as more than a question of individual humans and their access to music education. Feminist new materialist and posthuman scholars are also moving in this direction.

Diversity as Being Response-Able to Difficult Differences

Osgood (2021) exemplifies a posthuman understanding of diversity. These conceptualizations—starting from matter and materiality as shown by a Chinese festival celebrated in a British nursery and the noodles, chopsticks, and bathmats found there—understand diversity as a process that is not attached to the individual human subject and its intentions. Rather, diversity is "understood as more confederate, distributed and worldly" (p. 233). Thus, diversity becomes a process of being attentive to and response-able for the tentacular stories and entanglements that feminist new materialist onto-epistemologies enable. These onto-epistemologies make it possible to explore the lines that go from the everyday events of the nursery to the war on terror, or from sticky noodles on a bathmat to the gendered labor and discourses of motherhood that permeate the working conditions of early childhood educators. Osgood (2021) highlights how diversity in the nursery is becoming not only by the intentions of human subjects but also in entanglements of humans and nonhumans.

How Does Response-Ability to Difficult Differences Matter?

Paying attention to matter—the sticky noodles or the beautiful Hardanger fiddle—means being attentive to the becoming of the world. Through being attentive, we might become aware of our participations in these becomings. "The point is to get at how worlds are made and unmade, in order to participate in the processes, in order to foster some forms of life and not others" (Haraway, 1994, p. 62). This quote from Haraway points to the importance of not neglecting material agency, as well as affective and discursive agency, when taking part in the worlds becoming. By taking part in an active and insightful way, we might foster some forms of life and not others and be response-able to our productions.

When music education—with its association between participation and middle-class background and whiteness (e.g., Bull, 2019; Hess, 2018; Hovde, 2021; Jeppsson & Lindgren, 2018)—and feminist posthuman and new materialist education research meet, the potential of being response-able to difficult differences emerges. This intersection enables a shift from human intentions of diversity—keeping in mind that intentions of inclusion in SMPA are not guarantees for doing inclusion (Ulrichsen et al., 2021)—toward the production of possibilities and impossibilities for becoming, and it makes it possible to explore how these are differentially enacted.

Paying attention to the productions of music education means that diversity becomes more than a question of who the students are before entering music education. It also becomes a question of what the students are becoming through the education. This is not to say that questions of access are unimportant. But access is only half of the story. Who gets to become what is an equally important question. Who becomes what through which musical and educational practices? What is the role of matter, of instruments, rooms, money, and sheet music, in these productions?

Asking these questions makes it possible to move away from the beaten track of pleasant agreement on the importance and value of diversity (Kallio, Marsh, et al., 2021) and to explore the becomings of music education. One relevant question to ask is if the Breadth program, the program that aims to fulfill the vision of SMPA for all (The Norwegian Council for Schools of Music and Performing Arts, 2016), functions as an entry point to the Core and Depth programs that hold higher cultural value and might qualify the students for higher music education. Ellefson and Karlsen (2020) question if this is the case. They warn against a situation in which the students included in the Breadth program are excluded from the Core and Depth programs as the learning outcome of the Breadth program is considered to possess lower cultural value (Ellefsen & Karlsen, 2020).

Such explorations hold a potential for developing a more response-able music education research that moves beyond questions of access and toward engaging with the complexities of how social structures are becoming through intra-actions. These possibilities are related to the third area of exciting potential that emerges from a reading of feminist posthuman and new materialist education research and music education research: The potential for conceptualizing knowledge in ways other than the linear, individual, and representational ways that are dominant in music education research.

From Linear, Individual, and Representational Knowledge to Performative and Relational Knowing-in-Being

Knowledge is a wide and complex concept that, like music and diversity, eludes clear definitions. In a humanist tradition, knowledge is seen as developed in a linear fashion by individual human subjects, and as representations of reality (e.g., Barad, 2007; Strom & Viesca, 2021). This conceptualization of knowledge is present in music education research. But as with the centering of the human subject discussed previously, it is such an entrenched part of music education research that it has almost become invisible. The diffractive reading of music education and posthuman education research makes the humanist conceptualization of knowledge possible to grasp.

In education, including music education, there is a widespread conceptualization of children as not yet fully developed humans. Through passing through ages and stages, children become adults (Murris, 2016). This conceptualization enacts a temporality that considers time as moving in one line from past to future through the present (Lambert, 2021). The SMPA curriculum framework expresses a linear accumulation of knowledge through developmental stages with learning goals that build on each other (The Norwegian Council for Schools of Music and Performing Arts, 2016). Although the framework states that one student might develop at a different pace in different areas of competency than another student, the assumption of development as a linear process is not troubled.

The knowledge obtained is considered to reside withing the individual human. One example of this way of thinking of knowledge is found in an article discussing whether musicians are artists or crafts(wo)men (Varkøy et al., 2020). The authors' discussion of the relationship between arts and crafts and knowledge is wonderfully rich in philosophical perspectives and considerations. The richness of thoughts highlights how the anthropocentrism of the approaches is the one issue not questioned. A second example of research that assume knowledge to reside within the individual human is found in an article by Björk et al (2021) stating that "musical learning is a personal process with physiological, psychological, social, cultural and artistic dimensions" (p. 374). A third example is found in Kennedy's (2021) suggestion of emplacement as a concept to explain the spatial aspects of orchestral performance knowledge. While taking into account how awareness of space and place is important to orchestra musicians' performance knowledge, the individual musician is still centered.

An additional aspect in humanist conceptualizations of knowledge is knowledge as representation. The representationalist worldview is found in both realist (knowledge represents the reality) and constructivist (knowledge is socially or culturally constructed) sciences (Barad, 2007). In music education research, the linear learning and development leading to knowledge located in the individual human is often assumed to be socially and/or discursively constructed. One example of how these assumptions are articulated is found in an article written by Karlsen and Nielsen:

> The present study is based on social constructivist theory where knowledge – in the form of categories and concepts – is seen as constructed in and through social processes. "When people talk to each other the world gets constructed", Burr (1995, p. 7) claims, and these 'negotiated' understandings of the world are referred to as discourses. Our understandings and representations of the world are historically and socially situated, and, thus, discourses are seen as mediating certain ways of constructing the world. (Karlsen & Nielsen, 2021, p. 34)

There are numerous examples of discourse-oriented research in contemporary Nordic music education research. For a review of many of them, see Rolle et al. (2018). There seems to be a steady output of discourse-oriented research related to the Norwegian SMPA (Ellefsen & Karlsen, 2020; Jordhus-Lier, 2021a, 2021b; Karlsen & Nielsen, 2021; Letnes, 2020). The constructionist paradigm of SMPA research also includes a/r/tography centering the person(s) being artist/researcher/teacher (Øyen & Ulrichsen, 2021); sociological perspectives informed by Bourdieu's theories of (human) capital and habitus (Stabell, 2018); and research focused on teachers' professional practices (Angelo, 2012a; Dobrowen, 2020).

One example of this representational conceptualization of knowledge is found in a recent article on entrance auditions in Swedish higher music education; the theoretical framework of the article "is designed to capture how instrumental/vocal skills are represented by applicants in auditions … and verbally articulated and assessed by jurors" (Sandberg-Jurström et al., 2021, p. 23). Another example is found in an article by Vinge and Westby (2021) stating that "one way to understand the intention of the learning goals of the curriculum is that they aim to remind the individual SMPA teacher that the intention of the organization is learning and not just content and activity" (p. 112, my translation). In both these quotes, knowing and learning is separated from doings and, instead, associated with linguistic representations.

Knowledge as Knowing-in-Being

Barad argues that both scientific realists and social constructionists rely on a representationalist notion of knowledge (Barad, 2007). As an alternative, Barad suggest a performative notion of knowledge where the concepts of epistemology and ontology are reworked into an onto-epistemology or "the study of practices of knowing in being" (Barad, 2007, p. 185).[31] Also searching for other ways of conceptualizing the processes of knowing, learning, and becoming intelligible, researchers thinking with posthuman theories have coined concepts like more-than-human multimodal meaning making (Hackett & Rautio, 2019), knowledge-making and know-ing (Taylor, 2021), and educational relationality (Ceder, 2016).

The question guiding this inquiry asks how violin lessons are enacted and what they produce. Some of the answers to the latter part of this question has to do with the societal structures that are produced through violin lessons and with how different possibilities and impossibilities for becoming are constituted in the intersections of race, gender, and class. Another part of the answer has to do with the knowledge produced in the lessons. By conceptualizing this knowledge as performative and relational knowing-in-being, music, matter, and doings are also given attention in addition to the individual human subject and its rational knowledge.

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31   Onto-epistemology and other aspects of Barad's agential realism are discussed in detail in the following chapter.

This conceptualization creates possibilities for moving beyond the binary of research on one hand and practice on the other. Barad (2007) writes that "*practices of knowing are specific material engagements*" (p. 91, emphasis in original) and that *"theorizing, like experimenting, is a material practice* (p. 55, emphasis in original). In Barad's understanding of practices of knowing and theorizing as material practices lies the potential of really taking the material aspects of research seriously. To do research is to do worlding. It is to take part in the ongoing materializing of the world. Likewise, to do practice is to theorize and to produce knowledge.

Returning to Snaza and Weaver (2015) and their call to find questions of what education might mean without presupposing that the answers take the form of what education will make humans capable of, I am reminded of a question I sometimes get: What does your research mean and why does it matter? Often, the answer expected is an answer starting with the phrase "the research will change practices by …" Implicitly, there is an assumption that my research is not a practice, and that there is a practice "out there" that would benefit from some research. This is a linear conceptualization of the relationship between research and practice. But in my experience, the relationship is that of a messy knot more than that of a neat string.

As a human subject differentially constituted through intra-actions that encompass parts of the world named "practice"—teaching and playing and learning with children and violins and grappling with how to co-construct the structure of musical notation with a particular child and their patterns of thinking—and parts of the world named "research"—writing, thinking, humming while folding laundry, or reading with the software of Zotero—I find that research and practice are entangled. The world is materializing through intra-actions whether I read and write or play or sing, whether I intra-act with a book or a bow, a supervisor or a student. Thus, the question of how my research will impact practice does not make sense to me. But I do hope my research-practice will move me (the entangled conceptualization of me) toward being more response-able to my role in the world's materialization and that this, in turn, might be a part of a bigger move toward a more response-able community of theorization and experimentation in music education.

Returning to the Questions

What have we learned by reading music education research diffractively through feminist new materialist and posthuman education research? What differences emerged and why do they matter? What possibilities for future posthuman music education research were created?

Through this diffractive reading, I have noticed tendencies in music education research that previously were unnoticed by me, and I have found inspiration for moving in new directions when conducting this inquiry. These moves in new directions hold the potential to generate other knowledge of how violin lessons are enacted and what they produce. They also trouble the very notion of education. Lenz Taguchi and Eriksson (2021) suggest that the question of education concerns

> firstly, ontological issues of what a not yet adult being is thought to be and become; and secondly, how this child is to be treated, educated, and integrated into both a society of humans and a global world of other species and matter during the period of time which we call childhood. (p. 165)

Furthermore, as Lenz Taguchi and Eriksson write, posthuman and new materialist research studies ongoing and emerging relations and productions rather than taking the pre-existing human as the self-evident vantage point, and they work with onto-epistemologies, "which refer to the co-constitutive process of knowing-in-being" (p. 166). Combining these aspects—the question of what a child is thought to be and become and how it is to be educated *and* the decentering of the human while engaging with the entanglement of epistemology and ontology—is, according to Lenz Taguchi and Eriksson, difficult and urgent. This urgency stems from the Anthropocene and its climate change and extinction of species (e.g., Barad, 2017; Haraway, 1994). The increase in educational studies working with posthuman and new materialist thoughts suggests that researchers recognize the urgency of finding different responses to the current situation, despite the complexity of the endeavor. Chappell (2022) puts it like this: "There is no alternative but to find new and different responses, if 'we'—humans and other-than-humans—are all to thrive" (p. 496).

By thinking of music through agential realism, like Showen and Mantie (2019) do, music becomes agentic and performative. This notion of music holds the potential for a focus in SMPA-related research in which matter, music, and children are given more attention, and relations, not pre-existing subjects, are centered. As became evident in the overview of SMPA-related research, the humans at the center of SMPA research are adults expressing their words and their intentions. The materiality of musical practice is, to a large degree, ignored. Thus, the intra-actions of humans and nonhumans within music education are yet to be explored in the detailed and engaging ways that are done in early childhood education (e.g., Osgood, 2019; Osgood & Mohandas, 2021; Osgood & Odegard, 2022). I believe there is great potential for doing research that offers novel perspectives on music education in the intersection of feminist new materialist and posthuman education research, and I aim to explore some of these possibilities through this dissertation.

I begin this endeavor in the following chapter by grappling with agential realism, affect theories, intersectional feminism, and Sámi onto-epistemologies, and by engaging with the possibilities they offer when exploring how violin lessons are enacted and what they produce.

Chapter 3: Thinking With Agential Realism

Music is never fixed in one place; it is always on the move, always changing, always reinvented. A chord progression could always be played with a little more emphasis on the dominant chord, the phrasing of a melody could always be a little more nuanced, and the tempo could always be stretched in one direction or the other. The movements of music are not arbitrary. There are rules that create boundaries defining what can and cannot be done within musical traditions and genres. The instruments and the players have their limits to what sounds they can produce. But these possibilities and impossibilities are never fixed; they are becoming in the music making. Every choice, every coincidence, and every slightly untuned string makes a difference to the music played because the elements of the music—the players, the instruments, the traditions, the audience, the room, the memories, the time—are entangled. Each difference creates new possibilities and impossibilities, every turn in one direction reveals a set of possible directions while closing off others. The rules of music—the possibilities and impossibilities—are constantly re-created.

Although the rules we play by are changing, they are not arbitrary. Not in music and not in research. Like musical rules, theoretical rules and the possibilities and impossibilities for thinking and writing and researching they create are produced through intra-actions. Thus, the rules of research and music are neither determined before we start nor are they randomly becoming, and this chapter is not a presentation of already-fixed theories. It is an experiment in theories and the possibilities and impossibilities they create.

> Theorizing, a form of experimenting, is about being in touch. What keeps theories alive and lively is being responsible and responsive to the world's patternings and murmurings. Doing theory requires being open to the world's aliveness, allowing oneself to be lured by curiosity, surprise, and wonder. Theories are not mere metaphysical pronouncements on the world from some presumed position of exteriority. Theories are living and breathing reconfigurings of the world. The world theorizes as well as experiments with itself. (Barad, 2012, p. 207)

To be in touch with alive and lively theories, to respond to the world's aliveness, and to be lured by curiosity, surprise, and wonder are not the things I used to associate with the theory chapters of doctoral dissertations. But as I have thought with theory, lived with theory, written with theory, and played with theory, Barad's words have reworked my conception of theory chapters and theories in general. I have experienced how theory is not a neutral tool to investigate what is already there. Rather, theory offends; it blocks the reproduction of what

is already known, and it creates new possibilities for thinking and doing (MacLure, 2010). Theorization is a material practice that matters (Barad, 2007).

The question that runs through this dissertation is *How are violin lessons enacted and what do they produce?* In this chapter, I experiment with the theories I think with (Jackson & Mazzei, 2012) when doing inquiry. As theories are not neutral, nor are they outside of the research, the theories I think with have already been part of the becoming of the question I ask, and they have worked in the two previous chapters. The theories also take part in the becoming of the answers to the question (that actually turned out to be concepts, not answers), and they are reworking the question throughout the dissertation. Theories do not sit still, and they do not exist outside of the world. They are living and breathing reconfigurations of the world and to theorize is to experiment by being in touch with the world (Barad, 2012).

The main theory that I think with is Barad's (2007) agential realism. But in line with Barad's reworking of boundaries, their topological thinking, and their understanding of the relational and intra-active nature of the world—and in line with how the rules of music work—agential realism is not a theoretical framework in the sense that it sets the frames or the boundaries of the inquiry. Rather, I take agential realism to be the starting point of an exploration of entanglements. Throughout this chapter, I aim to trace the theoretical string figures and knots (Haraway, 1994, 2016; Moxnes & Osgood, 2019; Murris, 2022; Osgood & Giugni, 2015) that I play and think with. What are the knots and string figures of agential realism? How are these knots connected to other knots? What possibilities and impossibilities for theorizing and experimenting are created in their entanglements?

This chapter consists of four parts. After this first introductory part, the second part concerns the ontological turn, an umbrella term for posthumanism, new materialism, affect theories, and other fields engaged with the entanglement of ontology and epistemology. The third part is the main part of the chapter where I engage with agential realism and its concepts, in particular the concept of diffraction. In the fourth part of the chapter, I follow some of the strings that tie the knots of agential realism to affect theory, intersectional feminism, and Indigenous and Sámi studies. I end the chapter by I re-turning (Barad, 2014) to agential realism and I ask what its intra-actions with affect theory, intersectional feminism, and Indigenous and Sámi studies might make possible and impossible when doing research.

The Ontological Turn

Science, like music, operates with certain sets of rules and assumptions that govern what can and cannot be done. Over time, these become given, self-evident, and normal (St. Pierre et al., 2016). One such set of rules and assumptions is humanism. Humanism privileges the (white, male, heteronormative, able-bodied) human subject and thinks in binaries such as nature/culture or human/nonhuman (Braidotti, 2013). Another and associated set of rules are qualitative research methodologies that separate the world into "data" and "findings." When established sets of rules are contested, when we are jolted out of taken for granted assumptions, a paradigm shift (Kuhn, 2012) occurs. St. Pierre (2016) argues that a rethinking of *being* could be the jolt that takes us into a new paradigm: the ontological turn.

The ontological turn is a term used to describe a field of thought that, although heterogeneous, shares an interest in exploring the science possible after the postmodern critiques of science, and that places an emphasis on the significance of materiality and material agency (Lather, 2016; MacLure, 2013). These theories after the ontological turn also share a refusal of the humanist subject as a rational, conscious, and autonomous human (MacLure, 2017), and of binaries such as nature/culture and human/nonhuman (MacLure, 2013). There are no unifying terms for the theories constituting this field, but they are often placed in the partly overlapping categories of posthumanism and new materialism. One example of this is that Barad themselves names agential realism as both new materialist and posthumanist (Barad, 2007).

The feminist influences on the theories that fall under the umbrella term "the ontological turn" are strong (MacLure, 2013), and many scholars, including Barad, define themselves to be working with *feminist* new materialism and *feminist* posthumanism. One example of the entanglements of these theories is found in the aforementioned international network PhEMaterialisms. Embedded in its name are references to posthuman philosophy (Ph), multiple feminisms (Phem, pronounced fem), education in its broadest sense (E), and new materialist thoughts (Materialisms) (Strom et al., 2019). The feminist influence in the ontological turn does not necessarily take the form of an interest in topics related to gender but rather as a feminist understanding of how the world works. One example of the feminist influence is Haraway's critique of the God trick, the idea that there is a place from where an independent observer might gaze, and her notion of situated knowledges (Haraway, 1988). Her insight is foundational for the rethinking of the relationship between nature and culture.

Another important foundation for the ontological turn is poststructuralism. Poststructural thinkers, although heterogeneous, "are all disenchanted with (although not necessarily wholly dismissive of) the legacy of Enlightenment rationality, its faith in progress through

the application of science, and its privileging of mind over bodies and matter" (MacLure, 2010, p. 279). These shared thoughts have been taken up by new materialist and posthumanist scholars. Poststructuralist philosophers have also contributed in more specific ways toward the ontological turn. Butler's conceptualization of gender as performative has had a major influence on the development of new materialist and posthumanist approaches (Barad, 2007; Osgood & Robinson, 2019a); other influences include the discourse theory of Foucault (Barad, 2007), the deconstruction concept of Derrida (Lather, 2016), and the immanent philosophy of Deleuze and Guattari (Lather, 2016).

But new materialism and posthumanism do not follow a linear progression from poststructuralism. While building on the poststructuralist interest in performativity, deconstruction, and discourse, new materialist and posthuman scholars also critique the humanism and Anthropocentrism of poststructuralism (Barad, 2003; Braidotti, 2013; Lather, 2016). Thus, the ontological turn entails "a very different temporality than that of successor regimes, end-isms, and apocalyptic breaks" (Lather, 2016, p. 5). The turn is both a departure from *and* a continuation of poststructuralist thinking (Davies, 2018). It is a cutting together-apart in one move that acknowledges creativity and innovation while also understanding the entanglements with past and future (Barad, cited in Juelskjær & Schwennesen, 2012).

A shared point of departure for many scholars working within the ontological turn is a critique of the humanist conception of a unified, individual, and rational human. "If feminist, antiracist, multicultural science studies—not to mention technoscience—have taught us anything, it is that what counts as human is not, and should not be, self-evident" (Haraway, 1994, p. 64). Thus, rather than taking the human subject as a given, the ontological turn argues for a relational ontology through which subjects are becoming through relations or intra-actions with others (Barad, 2007; Braidotti, 2013; Lather, 2016). Two examples of such conceptualizations of human subjectivity are nomadic subjectivity (Braidotti, 2013) and subjectivity as differentially constituted through intra-actions (Barad, 2007).

Another shared point of departure for scholars working in the ontological turn is a reworking of the notion of agency to also include nonhumans. Coole and Frost (2010) describe an orientation in new materialism scholarship "that is posthumanist in the sense that it conceives of matter itself as lively or as exhibiting agency" (Coole & Frost, 2010, p. 7). This interrupts the binary of realism and social constructivism and demands a renewed interest in, and a rethinking of, how matter comes to matter (Barad, 2007; Haraway, 1994; Lather, 2016; Osgood & Robinson, 2019a).

Theories within the ontological turn have expanded questions of ethics, responsibility, and accountability to not only include human intentions but also our role in the production of knowledge and realities. We "invent and reinvent the world" (St. Pierre, 2017, p. 5) in writing. We meet the universe halfway (Barad, 2007). We are becoming through a "risky game of worlding and storying" (Haraway, 2016, p. 13). These thoughts do not only situate us as researchers; they place us within the world, enlarging our ethical responsibility for what our intra-actions produce.

Agential Realism

Linear structures, starting from one point and working through a set of conditions and arguments until a conclusion is reached, dominate qualitative research. Framing this dissertation as a postqualitative dissertation that positions theories, not methodologies, as the starting point (e.g., St. Pierre, 2020) allows for other structures to be used. Terms like posthumanism or agential realism do not represent neat, bounded scholarly practices. They are what Haraway (1994) calls "place markers, emphases, or tool kits—knots, if you will" (Haraway, 1994, p. 65). Thus, this third and main part of the chapter is structured as knots[32] (Haraway, 1994, 2016; Moxnes & Osgood, 2019; Murris, 2022; Osgood & Giugni, 2015; Zarabadi et al., 2019) in the form of shorter sections that engage with particular theoretical concepts. Even though the knots' order is not arbitrary—I have tried to be mindful of how the sequencing works for the reader—they do not relate to each other in a linear way. When one concept is engaged with, I use other concepts that have not yet been fully explained. To think that one must have a complete understanding of a concept before it is put to use is to fall back on the representational logic of correspondence between, and thus separation of, words and things, theory and practice (Strom & Mills, 2021). Rather, the concepts of agential realism are threaded through one another, creating shifting, diffractive patterns. The cuts made to make them into knots are agential cuts cutting together-apart rather than cuts creating absolute separability (Barad, 2014).

But before engaging with the concepts of agential realism, I want to acknowledge the seeming paradox of advocating a relational and entangled worldview while relying on an individual scholar in doing so. One way I try to be mindful of the collective and entangled nature of

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32   Another possible figuration would be that of the rhizome, the root system of some plants that moves in multiple directions in a nonhierarchical way. Rhizome as a theoretical concept was coined by Deleuze and Guattari (1987). Although the immanent philosophy they proposed is often used by scholars working within the ontological turn, I have not engaged with their work. Thus, I stick to the figurations of strings and knots suggested by Haraway (1994) and taken up by feminist scholars.

scholarly writing, including the writing of Barad, is to relate agential realism to the ontological turn and to affect theory, intersectional feminism, and Indigenous and Sámi studies. A second way I acknowledge the way agential realism is becoming through intra-actions is by paying attention to how Barad brings the text of others into their own writings. Throughout their work, Barad extensively quotes, reads, and engages in conversations with other scholars as well as texts from poets and playwrights. Thus, the writing subject termed Barad—a subject "intra-actively constituted through practices of sense-making" (Barad & Gandorfer, 2021, p. 30)—is becoming in intra-actions with brittlestars, jute mills, and poems, as well as through intra-actions withing the fields of science, feminism, and philosophy.

A third way to take into account the collective and entangled nature of Barad's work is to acknowledge that it does not only take the form of written words. Their work materializes in particular copies of books and papers. My physical copy of the book *Meeting the Universe Halfway* has been my companion in writing and thinking for years. It has been marked in numerous ways by pen and pencil, wear and tear. I have created my own index in the front, and every second page has a dog-ear. Its material form, the way I have been able to flip through the pages looking for an underlined sentence that I once thought was worth remembering, is part of how agential realism works in this dissertation. Barad's work also materializes as talks, many of them uploaded to YouTube. As English is my second language, and maybe also because of the way I am trained to listen to music, these talks have not taken the form of comprehensive accounts and explanations possible to quote or to refer to. They are making sense in another way, in a more auditive and intuitive way. Thus, the talks are not traceable as references in the text although they are working in my thinking. And the work of Barad takes the form of a weekly reading group I participate in where we, paragraph by paragraph, read and discuss Barad's book. These discussions have been very important in my reading of agential realism.

A fourth way of thinking of agential realism as collective and entangled is to be attentive to how Barad relates to their previous work when writing. In *Meeting the Universe Halfway*, Barad (2007) writes that agential realism is their central theoretical framework, making explicit the integral nature of epistemological, ontological, and ethical concerns. In works written since, Barad has continued developing this framework through an ongoing conversation with their 2007 book. Although there is a deepening and broadening of their thoughts over the years— they have possibly moved in a more complex, more evocative and, although they seldom use the word, affective direction—I do not perceive there to be a break or a fundamental change in their understanding of the world. Thus, I do not attempt to create a genealogy of agential realism, and I move across Barad's texts published over a span of nearly 20 years without

contrasting them with each other. Rather, I take the concepts of agential realism as starting points, beginning with diffraction.

Diffraction

Diffraction is a physical phenomenon unique to wave behavior. One example of diffraction is seen when water waves meet an obstacle and spread out or bend. Diffraction is also a research practice. It is the overarching trope in Barad's book *Meeting the Universe Halfway* and a material and semiotic figuration for their methodological approach (Barad, 2007). Diffraction was first proposed by Haraway (1992) as an alternative to reflection; it has since been developed by Barad in intra-action with Haraway and other feminist thinkers. Barad builds their understanding of diffraction on the philosophy–physics conceived by the physicist Niels Bohr. Bohr created his philosophy of epistemology based on the physical experiments that are foundational to quantum physics. I will engage with one of those, the two-slit experiment and its relation to the phenomenon of diffraction, shortly.

But why does quantum physics have a place in a music education doctoral dissertation? There are two reasons I engage with quantum physics questions. The first reason is that insights from quantum physics invited Bohr, and later Barad, to rethink the epistemological and ontological assumptions based on an "atomistic metaphysics that takes things as ontologically basic entities" (Barad, 2007, p. 138) and to reject "the representationalist triadic structure of words, knowers, and things" (p. 138). Barad's agential realism is one in which phenomena are the primary ontological unit,[33] performativity replaces representationalism,[34] and questions of ethics, ontology, and epistemology form an entangled ethico-onto-epistemology.[35] Barad has developed their agential realist by reading insights from critical social theories through insights from quantum physics. Thus, in order to engage with agential realism in a rigorous manner, I need to develop an understanding of the two-slit experiment that is so crucial to quantum physics.

The second reason to engage with quantum physics is that the physical phenomenon of diffraction is the guiding principle for how I conduct this inquiry. I do not use diffraction as a metaphor; it is not a physical phenomenon with characteristics similar to the research done. Diffraction is the methodological practice (Barad, 2003, 2007, 2014; Haraway, 1992, 1994)

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33   Phenomena are "*the ontological inseparability of intra-acting 'agencies'*" (Barad, 2007, p. 333). See the section on phenomena and on intra-actions in this chapter.

34   Performativity shifts our focus from representations of reality toward "matters of practices, doing, and actions" (Barad, 2007, p. 135). See the section on performativity in this chapter.

35   Ethico-onto-epistem-ology is a concept that appreciates "the intertwining of ethics, knowing, and being" (Barad, 2007, p. 185). See also the sections on knowing and intelligibility, and on ethics and response-ability, in this chapter.

I work with when thinking, reading, and writing theories and stories through one another. The engagement with diffraction in this part of the dissertation forms the conditions for the following chapters.

I start this section on diffraction by explaining the two-slit experiment and by discussing how the insight from the experiment invites a rethinking of the concept of boundaries. Then, I introduce diffraction as a research practice—as a concept and figuration for exploring how differences are made, where the effects of differences appear (Haraway, 1992), and "which differences matter" (Barad, 2007, p. 378). The methodological implications of this practice are thoroughly discussed in Chapter 4.

The Two-Slit Experiment

Diffraction as a physical phenomenon is what happens when waves encounter an obstruction in the form of an entity or another wave, and they bend, spread, combine, and overlap to create new wave patterns. Imagine throwing two stones in a still pond and picture how the ripples form growing circles. When the circles meet, the waves diffract and form a new pattern, a diffraction pattern. These patterns are created when crests (the highest points of a wave) and troughs (the lowest points of a wave) either amplify or neutralize each other. Thus, the diffraction pattern that emerges is not created by piling or adding waves, but by the effects of the differences in the waves and how they work together.[36]

In classical physics, the ability to overlap at the same point in space and time and to create diffractive patterns is what distinguishes waves from particles. Thus, waves are not things or entities in themselves, but they are disturbances in a medium like water or air. Particles, on the other hand, are material entities that occupy a given point of space at a given time. Until the beginning of the twentieth century, it seemed like everything in the world could be sorted into the distinct categories of waves and particles. These categories were considered to have mutually exclusive characteristics. An object was either localized—a particle with a specific placement in the world—or extended—a wave occupying more than one position at any moment in time (Barad, 2007).

But what if entities, for example electrons, behave like waves under certain experimental conditions and like particles under others? What if particles and waves are not given categories, but categories that emerge when the experiment is done? What if there are no categories at all, no predetermined entities with inherent traits? How would that transform our understanding of the world, ontologically and epistemologically? These questions were raised by the two-slit

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36   For a visual and auditive explanation of diffraction (or interference, Barad uses these words interchangeably) see this video: https://youtu.be/TqTWSSBcV_4?t=264

experiment, a fundamental experiment in quantum physics. In the following section, I take us through the two-slit experiment based on Barad's (2007) writings.[37]

First, imagine an apparatus. It consists of three parts: a sender, a barrier, and—on the other side of the barrier—a screen. The sender sends waves or particles toward the barrier, which is a flat vertical surface with two slits. On the other side of the barrier there is a screen. When the sender sends waves or particles—the two separate categories according to classical physics—they pass through the slits. If the sender sends particles, only the particles hitting one of the two slits will pass through, and the pattern emerging on the screen will be in the shape of the slits. The other particles will be stopped by the barrier and fall down. If the sender sends waves, they meet the barrier, go through the slits, and spread out on the other side creating a diffractive pattern. In this experiment, the two-slit apparatus is a measuring apparatus determining the value of the entities sent. The emerging pattern, either a diffractive pattern of alternating bands or a pattern mirroring the placement of the slits, reveals if the sender has sent waves or particles.

So far, so good. But not for long. In experiments, electrons, molecules, and other entities sometimes behave like waves and sometimes behave like particles. How could this be? One possible answer, Bohr thought, could be that the electrons interfered with each other. However, when sent one a the time, they still behaved like waves and created diffractive patterns. As a further modification, Bohr equipped the barrier with a measuring device that, without interfering with the electrons in any way, measured whether an electron passed through one slit or another. When turned on, each electron passed through one slit, and they created a pattern mirroring the slit. When the which slit-detector was turned off, the electron created diffractive patterns.[38] In other words, electrons behave like matter under certain experimental conditions and like waves under others. If their different behavior is not a question of interference from the measuring device, how could this be explained?

To understand this physical experiment, we need to rethink the ontological assumptions of Western philosophy. If we think of entities as having predetermined traits—for example that electrons are either particles or waves before the experiment starts—the two-slit experiment is an impossibility. But if we think of the measured entity (the electron) and the measuring apparatus (the two-slit apparatus) as entangled parts of a phenomenon, the wave–particle

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37   Barad explains the two-slit experiment verbally and visually in this keynote https://youtu.be/dBnOJioYNHU?t=987

38   Bohr did these experiments as *gedanken* experiments. Gedanken experiments (gedanken is German for thought) themselves question the boundaries between theories and physical experiments, between discourses and matter, as they are experiments conducted by thought and not by physical apparatuses. Although not materialized, they give insight into real physical phenomenon. Bohr made detailed drawings of different versions of the two-slit apparatuses that were later proven to work in a real laboratory setup (Barad, 2007).

complementarity is "a matter of *the material specificity of the experimental arrangement that gives meaning to certain classical variables to the exclusion of others, enacts a specific cut between the object and the agencies of observation, and produces a determined value of the corresponding property*" (Barad, 2007, p. 268, emphasis in original). In other words, the questions we ask or the measurements we take do not determine the answers we get (constructionism), nor do they reveal answers already there (realism). The measurements are constitutive of the very nature of the thing we measure. This insight forms the foundation of Barad's claim that the basic ontological unit is phenomena consisting of intra-acting—"intra" signaling actions *within* and not inter or between—agencies[39] and of their argument for a performative, not realist or constructionist, worldview.[40]

Boundary-Making Practices

"There is more to diffraction than meets the eye" (Barad, 2007, p. 381) and the two-slit experiment has had a profound impact on the development of agential realism, and in particular on how boundaries are conceptualized. As argued in the section above, the two-slit experiment troubled the assumption that an object has predetermined traits measured by an objective measuring apparatus. Rather, as the experiment demonstrated, the traits of an object—in this example, whether it behaves like a particle or like a wave—are becoming through the intra-acting agencies of the phenomenon, and that this phenomenon includes both the object and the measuring apparatus. Thus, the boundaries of objects and measuring apparatuses are not predetermined or fixed. They are becoming through the intra-actions of phenomena.

Another way diffraction troubles the notion of boundaries as fixed, is by showing that what we assume to be neat boundary between light and dark around a shadow, actually are patterns of alternating lines of dark and light (Barad, 2007). The diffraction patterns of alternating bands of light and shadow invite a reconsideration of how the boundaries of categories like nature and culture, subject and object, human and nonhuman are not fixed; boundaries are becoming through intra-actions.

> Diffraction marks the limits of the determinacy and permanency of boundaries. One of the crucial lessons we have learned is that agential cuts cut things together and apart. *Diffraction is a matter of differential entanglements. Diffraction is not merely about differences, and certainly not differences in any absolute sense, but about the entangled nature of differences that matter.* This is the deep significance

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39   See the sections of phenomena and intra-actions in this chapter for an account of how Barad develops these insights.

40   See the section on performativity in this chapter.

of a diffraction pattern. *Diffraction is a material practice for making a difference, for topologically reconfiguring connections*. (Barad, 2007, p. 381, emphasis in original)

Thus, diffraction is an ethico-onto-epistemological matter that relates to the entangled nature of *differences that matter*. The emphasis on the differences that matter, the differences that take part in the world's differential becoming, holds heavy significance in terms of response-ability[41] for what these mattering differences do. As I wrote in the introductory chapter, the current epoch of the Anthropocene—the geological era where all aspects of the world, including its climate, are influenced by humans—calls into question the boundaries of nature and culture and demands response-ability for how our intra-actions "foster some forms of life and not others" (Haraway, 1994, p. 62). A diffractive research practice might contribute toward this endeavor.

Diffraction as a Research Practice

Although they emphasize the entanglement of physics and philosophy, Barad (2007) stresses that the interpretative issues of quantum physics are not settled and that no definite answers can be given to questions about the philosophical implications of quantum physics. Also, quantum physics principles are not to be used for drawing analogies between particles and people, or between micro and macro levels. Rather, quantum physics offers an imperative to confront questions of epistemology and ontology "such as the conditions for the possibility of objectivity, the nature of measurement, the nature of nature and meaning making, and the relationship between discursive practices and the material world" (Barad, 2007, p. 24).

This confrontation calls for other research practices than those premised on a representational logic that aim to mirror reality. In conversation with the work of Haraway (Haraway, 1992, 1994, 2018), Barad suggests a diffractive methodology "attending to and responding to the details and specificities of relations of difference and how they matter" (Barad, 2007, p. 71). A diffractive reading of texts aims to read insights from different fields through one another "in ways that help illuminate differences as they emerge: how different differences get made, what gets excluded, and how these exclusions matter" (Barad, 2007, p. 30). The diffractive methodology suggested by Barad is premised on a performative worldview.

Performativity

Barad's agential realism is a refusal of both scientific realism and social constructivism. Although these two worldviews entail different approaches to epistemology, they share an assumption that language and other semiotic systems mediate human access to the material

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41   See the section on ethics and response-ability in this chapter.

world. They share a representational worldview (Barad, 2007). As an alternative, Barad proposes a posthumanist performativity that shifts the focus of correspondence between descriptions and reality toward "matters of practices, doing, and actions" (p. 135). This allows for a move away from representationalist questions of reflection toward questions of diffraction, and from a geometrical toward a topological[42] understanding of relationality. The agential realism of Barad "is not about representations of an independent reality but about the real consequences, interventions, creative possibilities, and responsibilities of intra-acting within and as part of the world" (p. 37).

Furthermore, Barad (2007) writes that representationalism is linked to humanism and anthropocentrism in such powerful ways that the attempts to move away from it while not abandoning humanism, such as in the attempts by Bohr, Foucault, and Butler, have not been successful. Although Barad acknowledges these thinkers' valuable contributions to agential realism, Barad argues that such critiques of representationalism have been thwarted by anthropocentric remainders. The *posthuman* performativity suggested by Barad not only refuses the anthropocentrism of humanism and antihumanism but demands response-ability for boundary-making practices that mark the category of "human." Barad's posthumanism refuses the idea of a separability of nature and culture, or human and nonhuman, and, thus, the premise for a representationalist worldview falters. In a posthuman performative account, the world is neither constructed by humans nor already there waiting to be discovered. Likewise, to be "human" is not a fixed category. The world, including its humans and those marked as non-human or less-than-humans, are differential becoming in iterative intra-activities. In Barad's posthuman performativity, phenomena are the primary ontological unit.

Phenomena

Barad takes the primary ontological unit to be phenomena rather than independent objects. Building on Bohr's epistemological framework and the insight of the inseparability of "observer" and "observed", Barad suggests that Bohr's notion of phenomenon is to be understood ontologically. Thus, phenomena are "the primary ontological units" and "the basic units of existence" (Barad, 2007, p. 333). These units are not pre-existing units with inherent boundaries and properties; they are ontologically primitive relations. In other words, phenomena are relations without pre-existing relata or "*the ontological inseparability of intra-acting 'agencies*'" (p. 333, emphasis in original).[43] Phenomena are constitutive of reality as reality is composed of things-in-phenomena, not "things in themselves or things-behind-phenomena" (p. 140)".

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42   Topology has to do with the connectivity of the spacetime manifold while geometry relates to the shape and size of a bounded domain (Barad, 2007). See also the section on topology in this chapter.

43   Intra-actions are actions within not between. See the section on intra-actions.

In Barad's statement that phenomena are constitutive of reality and relations, lies a refusal of both realist and constructionist worldviews. Phenomena are not purely social constructs; they are specific material configurations of the world. Neither are phenomena mere human constructions as both humans and nonhumans are agential parts of the configuring and ongoing reconfiguring of the world. Humans, like other parts of nature, are not *in* the world nor are they on the *outside* looking in. Humans are *of* the world, and they "are intra-actively (re)constituted as part of the world's becoming" (Barad, 2007, p. 206). Thus, when I explore the question of how violin lessons are enacted and what they produce, I do not take violin lessons to be an already-existing practice, waiting to be researched. Rather, I conceptualize violin lessons as phenomena consisting of entangled intra-acting agencies. The intra-acting agencies are humans (me included) as well as nonhumans like strings, spiders, and sheet music.

Apparatuses and Agential Cuts

Barad elegantly writes that "the apparatuses of bodily production, which are themselves phenomena, are (also) part of the phenomena they produce: phenomena are forever being reenfolded and reformed" (Barad, 2007, p. 177). In an agential realist account, apparatuses are more than neutral instruments measuring the social or natural world. Apparatuses are specific materialdiscursive practices incorporating both the material and the discursive aspects of measurements. Through specific agential intra-actions, apparatuses enact agential cuts that produce the boundaries and properties of the components of the phenomena in question. These cuts "do not produce absolute separations, but rather cut together-apart (one move)" (Barad, 2014, p. 168). In other words, apparatuses create the entanglements and boundaries, the possibilities and impossibilities, of spacetimematter. Apparatuses "*are the material conditions of possibility and impossibility of mattering;* they enact what matters and what is excluded from mattering. … *Hence, apparatuses are boundary-making practices*" (Barad, 2007, p. 148, emphasis in original).

Thus, apparatuses are not located *in* the world; they are material configurations and reconfigurations *of* the world, producing differences that matter. This theory chapter exists as one part of the research apparatus working in this dissertation by creating possibilities as well as impossibilities for doing research. In Chapter 5, I give a thorough account of how the research apparatus of the inquiry has been tuned to the specifics of the entanglements at hand (Barad, 2007).

Intra-Actions

The concept of *intra-actions* is a key element of Barad's agential realist framework. The "intra" of intra-action signals actions within and replaces the more common notion of interactions. "Inter" means between, and interactions assume there to be pre-existing, separate individual agencies before the action. Intra-actions take phenomena or "*the ontological inseparability of intra-acting 'agencies'*" (Barad, 2007, p. 333, emphasis in original) as the primary ontological units. Thus, the agencies doing intra-actions emerge through their actions within the phenomena, and an intra-action "*signifies the mutual constitution of entangled agencies*" (p. 33, emphasis in original).

Phenomena come to matter—in the sense of part of the world making itself intelligible to another part of the world *and* in the sense of materializing—through specific *intra-actions*. The parts of the world, the agencies, are not distinct in an absolute and independent sense. They are becoming through specific agential intra-actions that create agential cuts between "subject" and "object". This is not the "subject" and "object" created by the Cartesian cut, which takes the distinction between the two of them for granted, but agential cuts creating the condition of exteriority-within-phenomena. This reworking of subjects and objects and its implications for objectivity and validity in research are discussed in the following chapter.

Intra-actions create agential cuts that "iteratively reconfigure what is possible and what is impossible—possibilities do not sit still" (Barad, 2007, p. 177). This is an alternative to the often-held debate between determinism and free will. On an agential realist account, the world is becoming in an iterative process of intra-actions. This leads to a reworking of the relationship between possibilities and impossibilities, continuity and discontinuity.

Dis/Continuities and Im/Possibilities

The agential realist understanding of the relationship of continuity and discontinuity, and of possibilities and impossibilities, is not one of negative opposition. Rather, Barad reworks these concepts into those of dis/continuities and im/possibilities. As an example of a dis/continuous movement, Barad writes of quantum leaps. When "leaping" from one energy level to another, the electron is never anywhere in between. This troubles not only the dichotomy between discontinuity and continuity but also the notion of dicho-tomy or cutting in two (Barad, 2010). This is connected to the concept of agential cuts cutting-together-apart (Barad, 2014), and to the feminist notion of difference as "not opposed to sameness, nor synonymous with separateness" (Trinh, 1991/1997, p. 416). In conceptualizing movements as dis/continuous, it becomes possible to grapple with the topological, not geometrical or linear, notion

of time and of genealogies—such as the genealogy of agential realism—as both continuous and discontinuous.

The concept of im/possibilities is an alternative to understandings of causality that take causality to be a question of correspondence between cause and effect. Thinking of causality as a question of the im/possibilities created by intra-actions makes it possible to avoid taking sides in the traditional debate between determinism and free will.

> Intra-actions always entail particular exclusions, and exclusions foreclose the possibility of determinism, providing the condition of an open future. But neither is anything and everything possible at any given moment. Indeed, intra-actions iteratively reconfigure what is possible and what is impossible—possibilities do not sit still. (Barad, 2007, p. 177)

Barad goes on to write that they could mark this notion of causality by saying that intra-actions are constraining, not determining; however, Barad elaborates that such a word choice would not do justice to the vital and lively way that the realizations of possibilities open up for other possibilities even while excluding others. The concept of im/possibilities is generative in developing insights into how violinists are becoming through intra-actions and in the intersections of race, gender, and class.

Materialdiscursive[44] Practices

From an agential realist viewpoint, the return to matter within the ontological turn is not a turn toward a fixed substance or a material world awaiting to be discovered. Rather, "*matter is substance in its intra-active becoming—not a thing but a doing, a congealing of agency. Matter is a stabilizing and destabilizing process of iterative intra-activity*" (Barad, 2007, p. 151, emphasis in original). This is an understanding of matter that invites us to understand matter as referring to phenomena in their ongoing materialization. It also invites us to understand matter as a discursive production. Discursive practices are the "*specific material (re)configurations of the world through which the determination of boundaries, properties, and meanings is differentially enacted*" (p. 148, emphasis in original). Furthermore, "discursive practices are the material conditions for making meaning" (p. 335). Discursive practices, like practices of materialization, are boundary-making practices and fully implicated in the dynamics of intra-activity through which phenomena come to matter. This leads to Barad's claim that "discursive practices and material phenomena do not stand in a relationship of externality

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44   Barad hyphens material-discursive. I have chosen to write it in one word in line with the writing of posthumanism (not post-humanism) and postqualitative (not post-qualitative).

to each other; rather, *the material and the discursive are mutually implicated in the dynamics of intra-activity*" (p. 152, emphasis in original).

Thus, material conditions do not support particular discourses, and material factors should not be considered as an addition to discursive ones. Material and discursive boundaries, entanglements, and doings are impossible to separate. Although agential cuts temporarily create different components within the phenomena, the material and the discursive are onto-logically inseparable. "Materiality and discursivity are mutually implicated in the dynamics of intra-activity" (Barad, 2007, p. 336). This has implications for how we understand structures like race, gender, and class. When viewed through the lens of agential realism, these structures are produced through intra-actions within particular materialdiscursive practices.

Agency

In agential realism, agency is not a trait. It is a doing. According to Barad, agency is "*a matter of intra-acting; it is an enactment, not something that someone or something has.* It cannot be designated as an attribute of subjects or objects (as they do not pre-exist as such)" (Barad, 2007, p. 178, emphasis in original). Furthermore, agency *"is 'doing' or 'being' in its intra-activity"* (p. 178, emphasis in original). This is a performative understanding of agency where there are no definitive boundaries between the agent and the agency done. Rather than being a trait or attribute *of* an agent, agency is the doing through which the agent becomes an agent. This understanding of agency is not aligned with human intentionality or subjectivity; thus, agency does not necessitate an intentional subject, and agency can be done by human and nonhuman bodies as well as all material configurations of the world including space, time, and matter.

When the space for agency is no longer restricted to the intentions of humans, it becomes larger because holding the categories of humans and nonhumans fixed excludes "an entire range of possibilities in advance, eliding important dimensions of the workings of agency" (Barad, 2007, p. 178). When the scope of agency is enlarged, so is the space for responsibility.

Ethics and Response-Ability[45]

Barad calls for "an ethics of worlding" (Barad, 2007, p. 392) that is not restricted to human–human encounters. As the boundaries of "humans," like any other figuration, are constantly being reconfigured, questions of responsibility must take into account all bodies. "Just as the human subject is not the locus of knowing, neither is it the locus of ethicality" (Barad,

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45   There is a shift in Barad's writing from "responsibility" (e.g., Barad, 2007) to response-ability (e.g., Barad 2012, 2014). I perceive the term "response-ability" to be a deepening and expansion of, not a break from, "responsibility".

2007, p. 393). This calls for an ethics that takes into account not only humans but also other-than-humans and nonhumans as well as space and time. "Responsibility entails an ongoing responsiveness to the entanglements of self and other, here and there, now and then" (Barad, 2007, p. 394)

Furthermore, as phenomena are the primary ontological unit with no inside/outside and the parts of phenomena are becoming through agential cuts cutting together-apart (Barad, 2007, 2014), ethics is "not about right response to an exterior/ized other, but about responsibility and accountability for the lively relationalities of becoming of which we are a part" (Barad, 2007, p. 393). In later works, Barad builds on the writings of Anzaldúa (1987) and rework responsibility into response-ability (Barad, 2012, 2014, 2021). Response-ability is about being ethically in touch with the other rather than theorizing from outside (Barad, 2012). It "is an ongoing practice, an interactive intra-active responding and enabling responsiveness" (Barad & Gandofer, 2021, p. 30).

Barad's understanding of response-ability transcends the individual human and calls for ethical considerations that "must be thought in terms of what matters and what is excluded from mattering" (Barad, 2007, p. 394). It also brings to attention the idea that what might seem far off in space and time might (also) be close and demanding of our response, an idea that connects to the topological understanding of spacetimematter.

The Topology of Spacetimematter

Western epistemologies rely on an understanding of space as a container or context, of time as linear, predictable, and progressing, and of matter as pre-existing *in* space and time (Barad, 2007). On Barad's agential realist account, space, time, and matter are intra-actively produced in "an iterative becoming of spacetimemattering" (p. 234). Becoming is, in Barad's terms, not an unfolding in time and space. Becoming is an enfolding. Enfolding changes the topology—the questions of connectivity—of the spacetime manifold and reworks the boundaries between the exterior and interior. Thus, topological questions of boundary, connectivity, interiority, and exteriority must supplement and rework geometrical questions of bounded size and shape (Barad, 2007).

Furthermore, Barad argues that time, space, and matter are part of the phenomena in question and that "phenomena cannot be located in space and time; rather, phenomena are material entanglements that 'extend' across different spaces and times" (Barad, 2007, p. 317). The ongoing, differential materialization is not contained or formed by time and space; rather, "*iterative intra-actions are the dynamics through which temporality and spatiality are produced*

and iteratively reconfigured in the materialization of phenomena and the (re)making of material-discursive boundaries and their constitutive exclusions" (p. 179, emphasis in original). Thus, space and time are not fixed parameters outside of phenomena; they are becoming through intra-actions within phenomena.

Like space and time, matter is also becoming through iterative intra-actions. But since phenomena are the primary ontological unit, not entities, "*matter refers to the materiality and materialization of phenomena*, not to an assumed, inherent fixed property of abstract, independently existing objects" (Barad, 2007, p. 210, emphasis in original). The topological notion of spacetimemattering creates the possibility for re-turning, not as going back to what was already there "but re-turning as in turning it over and over again—iteratively intra-acting, re-diffracting, diffracting anew" (Barad, 2014, p. 168). Thus, the past and the future are enfolded participants in matter's iterative becoming (Barad, 2007, p. 181).

The topological understanding of space and time became particular generative in this inquiry as the lessons I observed were moved to online platforms due to the COVID-19 pandemic. The insight generated from reading stories from online lessons through agential realism changed my conceptualization of spacetimemattering, which, in turn, made it possible to re-turn to the stories from face-to-face lessons and developing deeper insights into how space and time are becoming.

Objectivity

Representationalism—the idea that representations and the objects they are purported to represent exist independent of each other—raises questions of accuracy and correspondence. The posthuman performativity proposed by Barad directs inquiry toward practices and their effects and conditions. Thus, agential realist concerns of objectivity are moved from questions concerning how accurate a representation is toward questions about how to be response-able for our doings and what they produce.

As the primary ontological unit is not subjects and objects but phenomena consisting of intra-acting agencies, Barad writes that "*a condition for objective knowledge is that the referent is a phenomenon* (and not an observation-independent object)" (Barad, 2007, p. 198, emphasis in original). Phenomena are "*the ontological inseparability of intra-acting 'agencies*'" (p. 333, emphasis in original), and, thus, they are marked by exteriority within, not by fixed boundaries of inside and outside. Therefore, "knowing is not a matter of reflecting at a distance; rather it is an active and specific practice of engagement. To know is to become entangled; objectivity requires that one take responsibility for one's entanglements" (p. 543, footnote 1).

Furthermore, "objectivity is about being accountable to the specific materializations of which we are a part" (p. 91). This notion of objectivity requires a methodology that is attentive to and response-able to the intra-active materialization of the world. I develop these thoughts in the chapter to follow.

Knowing and Intelligibility

Barad states that "knowing is a matter of part of the world making itself intelligible to another part" (Barad, 2007, p. 185). The parts of the world making themselves intelligible are not cartesian, dualistic, separate parts, but are parts becoming through agential cuts cutting within the phenomenon in question. Thus, knowing is a practice, and practices of knowing and being are mutually implicated. This is a reworking of the concept of epistemology and ontology into an onto-epistemology, or "the study of practices of knowing in being" (p. 185), that offers a profound shift from representationalism, which states that knowledge and the world of which we know are separate.

> Making knowledge is not simply about making facts but about making worlds, or rather, it is about making specific worldly configurations—not in the sense of making them up ex nihilo, or out of language, beliefs, or ideas, but in the sense of materially engaging as part of the world in giving it specific material form. (Barad, 2007, p. 91)

Barad proposes a shift from knowledge as representing or constructing reality toward knowing as intra-action, as part of the world making itself intelligible to another part of the world, and as a matter of differential responsiveness. As with the agential realist understanding of agency, intelligibility is not restricted to being a purely human practice nor does it align with intentionality. "Knowing is a matter of intra-acting" (Barad, 2007, p. 149), an ongoing performance of the world done by all forms of agencies, not only humans. "Knowing is a distributed practice that includes the larger material engagement" (p. 379). Thus, practices of knowing—like playing the violin—are materialdiscursive practices involving humans and nonhumans. In this ongoing differential articulation of the world lies a deep commitment to be response-able to our part in these doings as "knowing requires differential accountability to what matters and is excluded from mattering" (p. 380). Barad suggests ethico-onto-epistemology as a concept for the intertwining of ethics, knowing, and being.

Ethico-Onto-Epistemology

As the knots above have shown, the concepts of agential realism are entangled and co-constitutive, and their relations are not hierarchical. One concept is reliant on an understanding

of another concept, and when the two concepts are read through a third, the understanding shifts again. Nevertheless, in my current engagement with agential realism, there are two concepts that stand out as particularly important: *diffraction* and *ethico-onto-epistemology*. As I wrote earlier, diffraction is not a metaphor; it is "*a material practice for making a difference, for topologically reconfiguring connections*" (Barad, 2007, p. 381, emphasis in original). This topological reconfiguring entails that connections, for example the connections of concepts, might be made and remade. When thinking of agential realism, diffraction is for me the concept that moves, diffracts, spreads out, and disturbs, while ethico-onto-epistemology—the entanglement of ethics, knowing, and being—is the concept reminding me that there is no outside of the universe. "We know because we are *of* the world. We are part of the world's differential becoming" (p. 185, emphasis in original). To know while being part of the world and to take part in the world's differential becoming is a deeply ethical matter. "We need to meet the universe halfway, to take responsibility for the role we play in the world's differential becoming" (p. 396). We need to think ethico-onto-epistemologically.

Part of doing so, is to be attentive to how agential realism is connected to other theories. In the following section, I trace some of the strings that tie the knots of agential realism to affect theory, intersectional feminism, and Indigenous and Sámi studies.

Dis/Continuing Agential Realism

The entanglement of being and knowing means that we think not only with theories but also with material and bodily experiences. As Barad writes in the quote that I used in the introduction of this chapter, "theorizing, a form of experimenting, is about being in touch. What keeps theories alive and lively is being responsible and responsive to the world's patternings and murmurings" (Barad, 2012, p. 207). One of the ways Barad's notion of dis/continuity comes alive for me is through the way music—when touching me and being touched by me—can belong to several categories at the same time in a dis/continuative way.

One example of this is the band Resjemheia.[46] They play Norwegian folk music. And they play blues music. To my ears, they do not create a new genre by playing a mix of the two, nor do they alternate between the two styles of music. They play fully Norwegian folk music and fully blues music, sometimes with the one being more in focus than the other. The relationship between the two genres in the way Resjemheia plays them exemplifies dis/continuity: There are two distinct genres as well as a continuum moving between them. One dimension does

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46   A video of one of their live performances can be seen here: https://youtu.be/sQwfnpBB-S8

not erase the other. Another musical dis/continuity, referred to in the first chapter, exists in the way musical motifs are linked together in old, Norwegian folk music, with the last bit of one motif also being the first bit of the next motif.

When moving into the fourth part of the chapter, I want to keep in mind the Baradian concept of dis/continuity. In this part, I engage with affect theory, intersectional feminism, Indigenous and Sámi onto-epistemologies, and with some of the critiques raised against agential realism. I try to engage with the relation between these fields and that of agential realism as a dis/continuity. They are not the same as they are distinct and separated fields, and they are tied together with strings that resemble a continuum along which I might move closer to one knot or another without ever cutting the strings from any of its connections.

According to agential realism, theories are not neutral tools used to measure what is already there. They are part of the research apparatus that explores entanglements. To responsibly explore the entanglements of the enactments of violin lessons, I must attune to "the particularities of the entanglements at hand" (Barad, 2007, p. 74). Affect theory offers possibilities for exploring the forces working with and across bodies. Intersectional feminist theory offers possibilities for exploring the entanglements of bodies and social structures. Sámi studies offer nonrepresentational conceptualizations of knowledge, music, and stories, as well as timely critique of feminist new materialist and posthuman theories.

Affect Theory

Affect is a slippery concept that is difficult to define in a traditional sense (Strom & Mills, 2021). But still, it is a force that demands our attention. The affective turn "expresses a new configuration of bodies, technology, and matter instigating a shift in thought in critical theory" (Clough & Halley, 2007, p. 2). Contemporary work on affect, building on the philosophies of Spinoza, Bergson, Deleuze, and Guattari as well as on feminist and queer theory, draws attention to the body and emotions, to the power to affect and to the power to be affected, and to the relationship between these two (Clough, 2007; Dernikos et al., 2020; Hardt, 2007). Affect is both actual and virtual. Affect is actual in its contacts, movements, and relations where potentialities may emerge and unfold. Affect is also virtual in being an abstract relational realm (Dernikos et al., 2020).

The term affect, as used within the affective turn, is not interchangeable with the term emotion. Although emotion is integral within the concept of affect, these terms are not to be conflated, and emotions can be understood as the fluid expressions of the affective event (Wolfe & Rasmussen, 2020). Furthermore, affects are not personal feelings. They are "a prepersonal

intensity corresponding to the passage from one experiential state of the body [body in the broadest sense] to another and implying an augmentation or diminution in that body's capacity to act" (Massumi, 1987, p. xvi). Following Massumi's distinction between emotions and affects, Shaviro (2010) writes that emotion could be attributed to an already-constituted and conscious subject, while affect "is primary, non-conscious, asubjective or presubjective, asignifying, unqualified, and intensive" (p. 1).

Affect theory and posthumanism share an interest in seeking to "disrupt the Cartesian notion of the self-contained, rational subject by embracing a view of bodies as porous and permeable human and nonhuman assemblages" (Dernikos et al., 2020, p. 6). In research drawing on Barad and other thinkers within the ontological turn, affect theories are put to work when investigating a variety of themes such as Australian school uniforms and gender (Wolfe & Rasmussen, 2020), the posthuman child as feral (Osgood & de Rijke, in press), the material of cork in kindergartens (Osgood & Odegard, 2022), or new teachers' entanglements in time and space (Lambert, 2021).

But in Barad's work, there is a curious lack of the precise term "affect." I find a deep engagement with forces and intensities working across humans and nonhumans. In Karin Murris's book *Karen Barad as Educator*, I find these sentences that help to think about affect and agential realism through one another.

> Their [Barad's] scholarship works in unexpected affective ways through questions that cascade infinitely. Being affected is more than emotion or feelings; it is a mutual performativity that troubles cognition/emotion, nature/culture, and inner/outer binaries. (Murris, 2022, p. 22)

To be named, that which is named must stick out; it must request a name. In the work of Barad, the term affect might not be used, affect might not be named, due to their engagement with the world as mutually performative. Thinking with performativity, the world is becoming through intra-actions, through being entangled, through the in-betweens, and through the forces working intra-actively. Thus, to name those forces "affect" would be to name all forces affective. However, there is an attentiveness to the doings of affect in Barad's writing.

> The inhuman is not the same as the nonhuman. While the "nonhuman" is differentially (co-)constituted (together with the "human") through particular cuts, I think of the inhuman as an infinite intimacy that touches the very nature of touch, that which holds open the space of the liveliness of indeterminacies that bleed through

the cuts and inhabit the between of particular entanglements. (Barad, 2012, p. 222, footnote 19)

"The between of particular entanglements" and "the space of the liveliness of indeterminacies" read to me as other ways of articulating affect.

How Does Affect Matter?

Then, why have I chosen to name these forces "affect" in this inquiry? At one of our sessions, my supervisor Professor Jayne Osgood gently prompted me in the direction of affect theory. She had recognized, before I did, that I would need a concept for the movements and forces working in the in-between spaces of the entanglements of the violin lessons. At first, the thought of reading yet another field of studies repelled me—in itself an affective force moving between my body and the body of literature—and I was hesitant to take her advice.

But as I continued grappling with this inquiry, I started to understand that I, in this particular inquiry, needed a concept for the forces working that did not fit into the categories of discursive and material, such as the fears and frustrations of living through the COVID-19 pandemic or the joy of breathing and playing and moving as a quartet rather than as four individuals. The concept of affect is well suited for this work. Affect also works to broaden understandings of learning beyond the view of learning as individual and intentional. According to Dernikos at al. (2020), affect in education is associated with the coming together of ideas, differences, and intensities across students, teachers, and knowledge that might change the speed or impact of moments and create different possibilities for actions in different bodies. Affective pedagogies happen outside of teachers' conscious intentions, which is in line with Barad's argument that agency is not restricted to human intentionality, and learning occurs in the intra-actions of human and nonhuman bodies. Rather than being a "thing" outside of us or contained within us, "affect happens to, with, on, through, and across us in divergent ways" (Dernikos et al., 2020, p. 8). Thus, pedagogy is not only about exchanging information from one being to another but also about creating new connections and new ways of thinking, seeing, and sensing (Dernikos et al., 2020). These thoughts work well with the agential realist concept of ethico-onto-epistemology and of part of the world making itself intelligible to another part (Barad, 2007).

In this section, I have briefly engaged with affect theory, and I have drawn some strings between this field and agential realism. Feminist theory has had a major influence on the development of posthumanism and, in particular, agential realism. There are many feminisms, and in the following part of the chapter, I engage with intersectional feminism and how the concept of intersectionality works in this inquiry when relating to different differences.

Intersectional Feminism

Intersectional feminism is interested in the connections and relations of the world (Carbado et al., 2013; Cho et al., 2013; Crenshaw, 1989, 1991). Crenshaw (1989) introduced the term *intersectionality* to address how Black women were discriminated against without being protected by the law. The law forbade discrimination based on gender and race, but it did not recognize discrimination based on the intersection of being both Black and female (Crenshaw, 1989).

Since the 1980s, intersectional studies have developed into a burgeoning field. Intersectional frames of analysis and perspective are applied to a wide range of context-specific inquiries; they inform methodological debates, and they offer intersectional critique and interventions in policymaking and social debates (Cho et al., 2013). For Ahmed (2017), intersectionality is "a starting point, the point from which we must proceed if we are to offer an account of how power works. Feminism will be intersectional 'or it will be bullshit,' to borrow from the eloquence of Flavia Dzodan" (p. 5).[47] Furthermore, Ahmed writes that intersectional thinking is messy and embodied. It is connected to how our bodies are, but also to how they are perceived and seen. Ahmed uses the example of entering doors to explore this. Sometimes and by some people, a woman is seen as a professor and the door to her institution is held open. At other times and by other people, she is seen as a brown person and the door is shut. Even though she may be treated differently depending on which role she is perceived to fill, she is always both female and brown in an entangled and integrated way (Ahmed, 2017).

How Does Intersectional Feminism Matter?

The work of intersectional feminists, particularly the writings of Ahmed, invites me to explore the entanglements of bodies and social structures, and on how differences work across them. According to intersectional feminism, differences are not oppositional nor are they simply additive. Categories intersect and create specific relations and entanglements. I connect this to Barad's conceptualization of subjectivity. According to Barad, human subjectivity is "differentially constituted through specific intra-actions" (Barad, 2007, p. 342). The specific intra-actions relate to categories such as race, gender, age, and class, but these categories are also becoming in intra-actions. Thus, a person might become racialized in some intra-actions while not in others because the categories we are becoming with are not simply additive but co-constitutive.

Intersectional theory is also relatable to Barad's notion of topology as a reconfiguration of the spacetimemaller manifold. Rather than taking a geometrical approach concerned with size and shape (what categories do we belong to?), Barad argues for an understanding of subject

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47   Flavia Dzodan's famous quote originated from the blog TIGER BEATDOWN (Dzodan, 2011).

formation that also takes into account the topological questions of boundary, connectivity, interiority, and exteriority. In Chapter 4, I read stories from violin lessons diffractively through intersectional feminism to generate insight into how im/possibilities for becoming violinists are created in the intersections of race, gender, and class.

Agential realism, intersectional feminism, and affect theory share a genealogy of Western academic thinking. In the following section, I discuss Indigenous and Sámi studies, and their roots in Indigenous knowledges and cultures. Although the origins of Sámi studies and agential realism differ, they both share an understanding of ontology and epistemology as entangled.

Indigenous and Sámi Studies

I approach Indigenous[48] studies while being aware of the historic and ongoing appropriation of Indigenous thought in academic scholarship and the colonizing past and present of academia. In my engagement with Indigenous studies and, in particular, Sámi[49] studies, I aim to think with respect and with attention to the specific onto-epistemologies in these traditions of thought while navigating the tensions created by a colonial and racist past and present. In this part of the chapter, I engage first with the field of Indigenous studies and the critique toward posthumanism raised by Indigenous scholars. Then, I turn to Sámi studies and, in particular, Sámi conceptions of knowledge and music.[50] I end this part of the chapter by suggesting some ways in which Sámi studies matter in the present inquiry.

Indigenous Studies

There are about 370 million Indigenous people spread over 90 countries, and their cultures, identities, and scholarly practices are rich and varied. There is no fixed definition of "Indigenous" (Keskitalo et al., 2021), and although Indigenous people share experiences of colonialism, it is important to keep in mind that "Indigenous knowledges can never be standardized, for they are in relation to place and person" (Kovach, 2009, p. 56).

Nevertheless, there are some shared understandings of Indigenous studies and its areas of interest. The main objective of a (then) emerging Indigenous paradigm is to critique "Western dualistic metaphysics, Eurocentrism and biased privileging of Western systems of knowledge" (Kuokkanen, 2000, p. 415) from a perspective based on Indigenous cultural practices. This critique includes a critique of the separation of epistemology from ontology. Wilson (2008)

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48   I follow the well-established practice of capitalizing Indigenous (e.g., Finbog, 2020; Gaski, 2017; Virtanen, Keskitalo, et al., 2021).

49   Also spelled "Saami."

50   I engage with the rich tradition of Sámi storytelling as a knowledge practice in the following chapter.

writes that "in Indigenous ontologies, reality is not an object but a process of relationships, and an Indigenous ontology is actually the equivalent of an Indigenous epistemology" (p. 73). This allows for relational and accountable ways of doing research (Virtanen, Olsen, et al., 2021; Wilson, 2008) and relational and place-based conceptions of knowledge (Kanngieser & Todd, 2020; Kovach, 2009; Virtanen, Olsen, et al., 2021).

In Western science, time is seen as a linear and stable container that serves as a referent across different bodies (Barad, 2007). But this is not a universal conceptualization of time. As a part of the European colonization, European settlers replaced polychronic systems of time with their own monochronic system of seconds, minutes, hours, weeks, months, and years (Matamua, 2021). Indigenous scholars work with diverse conceptualizations of time taking into account the particular climate, geography, seasons, cultures, and astrology of their land (Matamua, 2021).

The Indigenous concepts of knowledge and time are two examples of how the agential realist reworkings of concepts offered by Barad hold a dis/continuous relation to already existing concepts. Barad's reworkings offer something new in the context of Western academia even though they already exist in Indigenous studies. By thinking of this as a dis/continuity, it becomes possible to engage with both of these theoretical perspectives without conflating them into the same or privileging one over the other. However, the engagement with Indigenous studies in posthuman and new materialist texts is often that of erasure.

Indigenous Critique of Posthumanism and New Materialisms

Haraway (2008) writes that "we must find another relationship to nature besides reification, possession, appropriation, and nostalgia" (p. 158). And she might be right if by "we" she means Western[51] scholars. But other scholars, particularly Indigenous scholars, are already and always in relationship with nature, and from their perspective, onto-epistemology is nothing new. While the lack of newness in "new" materialism is recognized by many scholars (e.g., Chappell, 2018; Osgood & Robinson, 2019b; Strom et al., 2019), new materialisms are rightfully critiqued by Indigenous scholars who point out that the refusal of binaries and the relational onto-epistemology of new materialisms are anything but new (Hokowhitu, 2021).

Hokowhitu (2021) also critiques the Self[52]-referential nature of new materialisms, which is based in a genealogy predominantly influenced by the thoughts of white, Western men. This part of his critique partly disregards the feminist genealogy of agential realism, which

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51   "Western" is a contested, but useful, term that "refers to the influences of certain political, cultural, and economic features and influences that largely originate among European thinkers, and later also to the colonial powers established in the United States and Australasia" (Virtanen, Olsen, et al., 2021, p. 11).

52   I follow the author's practice of capitalizing the term.

includes prominent feminists of color such as Gloria Anzaldúa and Trinh Minh-Ha. However, Hokowhitu's main point is valid and worth noting: That naming thoughts already thought by Indigenous scholars as new is a colonial act. This critique is also relevant for posthumanism. Although the prefix "post" relates to what is made possible after and by humanism in a less linear fashion than the term "new" does, the "posts"—postmodernism, poststructuralism, post-epistemologies, and posthumanism (Lather, 2016; St. Pierre, 2019b)—still relies on references to the Western (white, male) tradition of humanist philosophies.

Scholars working within the ontological turn are critiqued for overlooking the work of Indigenous thinkers by not referencing it in meaningful ways (Rosiek et al., 2019; Todd, 2016). Sundberg (2014) argues that Euro-American posthuman scholars often frame the nature/culture split as universal rather than localized in a specific theoretical tradition. In not engaging with Indigenous thoughts and in not acknowledging that Western philosophies also are situated and partial, posthumanists participate in the erasure of Indigenous ontologies. Todd (2016) links this erasure to the academic systems that uphold the exploitation and dispossession of Indigenous people. The same structures within the academy reproduce the narratives that erase ongoing colonial violence (Todd, 2016) and uphold racist structures (Ahmed, 2012, 2017).

Western researchers and the structures we create and uphold have done much harm to Indigenous people, including classifying them as nonhuman. The academy has been and still is a place of structural violence where Western paradigms dominate, and Indigenous knowledge systems are marginalized (Ahenakew, 2016; Smith, 2021; Todd, 2016; Walker, 2015). In an effort to avoid referencing to Indigenous theorists as "disembodied representatives of an amorphous Indigeneity that serves European intellectual or political purposes" (Todd, 2016, p. 7), I engage, in the following section, with a specific area of study: Sámi studies.

Sámi Studies

The Sámi are the Indigenous people of northern Europe and the only Indigenous people in the European Union. Their traditional land traverses the middle and northern regions of Sweden, Finland, and Norway as well as the Kola Peninsula of Russia. There are between 75,000 and 100,000 Sámi people who, among them, speak nine different Sámi languages (Hilder, 2014; Keskitalo et al., 2021). In some areas, the Sámi's traditional livelihood is reindeer herding, and in other areas, it is fishing and small-scale farming (Kramvig & Flemmen, 2019). The Sámi and the Norse societies have a long and intertwined history. There are archeological findings suggesting the existence of two separate groups of people living in the southern part of the Sámi settlement area/southeastern part of Norway from the Late Neolithic and the Bronze Age (2350–500 BC). The findings suggest that although separate, the two groups had some

contact (Amundsen, 2017). The Old Norse Sagas include numerous mentions of Sámi people, including stories of marriages across the groups (Allto & Lehtola, 2017).

It is difficult to determine the degree of co-existence and/or dominance between the Sámi and the Norse societies in early historical periods. But we do know that from the seventeenth century onward the Sámi experienced forced Christianization. Starting in the mid-nineteenth century, they were subjected to cultural assimilation from Norwegian state institutions (Finbog, 2020; Hilder, 2014; Virtanen, Olsen, et al., 2021). The erasure of Sámi culture included the destruction of musical instruments, such as the drums often incorporated in spiritual rituals, and the banning of joik[53] (Hirvonen, 2010; Kallio & Heimonen, 2019). Although it has taken different forms in different areas (Kramvig & Flemmen, 2019), the historical and ongoing erasure of Sámi culture, land, language, and knowledge is massive, and the colonial and racist violence continues to effect Sámi people today (Josefsen, 2006; Midtbøen & Lidén, 2015).

A Sámi movement emerged in the twentieth century as a response to and a resistance against political and cultural oppression. The Sámi cultural revival aims to resist forms of cultural oppression, restore pride, and increase the representation of the Sámi in the Nordic public sphere. As a part of this revival, the Sámi music scene emerged in the late 1960s and has grown into a diverse scene of contemporary music (Hilder, 2014). There is also a growing and vital field of Sámi studies.

Sámi studies engages with a diverse range of topics that is researched from a Sámi standpoint using Sámi language terminology to produce knowledge of Sámi people, society, material and non-material culture, history, and environmental issues. The field emerged from a critique of Western scholars' objectifying and racist research and is part of a broader movement of Indigenous decolonialism. Sámi studies consists of a large number of scholars, many of whom have Sámi backgrounds (Virtanen, Olsen, et al., 2021) and it is beyond the scope of this dissertation to give a thorough account of the whole field. I engage with the Sámi methodology of storytelling in the next chapter. In the following section, I focus on Sámi conceptualizations of knowledge and of music.

Sámi Conceptions of Knowledge

I turn to Sámi conceptions of knowledge because they offer ways of understanding the entanglements of matter and discourse, nature and culture, being and knowing that resemble the concept of ethico-onto-epistemology offered by Barad. In the writings of Sámi scholars, I find possibilities for conceptualizing knowledge, knowing, and learning that are closely connected to matter and its agency, and that are attentive to how time works in multidimensional ways.

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53   Joik is the traditional vocal music of the Sámi people. It is also spelled "yoik."

It is beyond the scope of this chapter (and my ability) to give a comprehensive overview of Sámi conceptions of knowledge. Rather, I give some examples before discussing how these are connected to the agential realist ethico-onto-epistemology outlined earlier.

Indigenous methodologies put Indigenous languages, experiences, and knowledges at the center of knowledge construction (Porsanger & Seurujärvi-Kari, 2021). This materializes through researchers' use of Sámi concepts, which are often connected to material practices, when conceptualizing knowledge as well as through their relational understandings of ontology, epistemology, and ethics. One way of conceptualizing the entanglement of theories of knowledge, reality, and values, is through the *lávvu*[54] method (Porsanger & Seurujärvi-Kari, 2021). The authors use the lávvu and its three main poles as a metaphor for the three main dimensions of Indigenous methodologies: theories of knowledge (epistemology), understandings of reality (ontology), and value systems (axiology). By doing so, they highlight how these dimensions are interconnected. The Sámi language and its concepts, and thus the tools for theorization and doing research (epistemology), are closely connected to the lived experiences of being Sámi (ontology), and important values such as responsible relationships and reciprocity toward people, land, and communities (axiology).

"For Sámi people, the binary distinctions between nature and culture make little sense" (Kramvig & Flemmen, 2019, p. 79). Furthermore, respectful relations are considered important, facts and values are interwoven, and the actors of the world can be humans, nonhumans, or super-humans (Kramvig & Flemmen, 2019). Kuokkanen (2000) writes that Sámi knowledge is based on holistic observations through which the observers do not consider themselves separate from or outside of the observed; thus, Sámi epistemology is participatory and engaged. Yet, she continues, there are also other forms of knowledge such as intuitive or shamanic knowledge "which are received through altered stages of mind such as shamanic trances or sudden glimpses of 'seeing'" (p. 419).

The understanding of knowledge as knowledge-within is further developed in Finbog's (2020) doctoral dissertation. She suggests a "Sámi world-in-relation" as a concept that articulates the reciprocal relationships between people, things and objects, nonhuman beings and entities, cosmology, land, and nature. Finbog exemplifies this through exploring how there is no term for "nature" in the Sámi languages. Rather, there are many terms for nature in different relations.

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54   A lávvu is a tent constructed by raising three supportive poles. Adding more poles and a cover converts the lávvu into a movable home that provides its occupants with shelter against all kinds of weather. It also serves a social purpose by gathering families and their allies around the central fireplace (Porsanger & Seurujärvi-Kari, 2021).

> The term *luondu* for example, implies nature as in the character of something or someone; *olbmo luondu* meaning the nature of a human, or the environment being expressed as *luonddubiras*. On the other hand, when speaking of a geographical area or territories the word *meahcci* is used. (Finbog, 2020, p. 63, footnote 64, emphasis in original)

These words offer insight into systems of thought that are relational. Nature is not viewed as an already existing entity but is understood by its relations to humans and nonhumans. Another conceptualization of knowledge as relational is found in the term *árbediehtu*. This term names the collective and shared knowledge that moves across generations and places (Finbog, 2020). When doing *duodji*, a Sámi form of craft but also a knowledge system that I return to in Chapter 9, árbediehtu or embodied and inherited knowledge plays an important part.

Sámi Conceptions of Music

Another aspect from Sámi studies informing this dissertation is *joik*, the traditional unaccompanied vocal tradition of the Sámi people. Joik is only one part of the Sámi musical tradition and the contemporary Sámi music scene, but I have chosen to focus on this particular musical practice as it is a practice that survived the forced Christianization and assimilation into majority cultures. Joik was banned and punishable for a long time (Hirvonen, 2010), and the shame and stigma connected to joiking is still strong enough that joiking could be considered a controversial act (Kallio & Länsman, 2018). Nevertheless, it is also one of the most visible and best-known features of Sámi culture (Hirvonen, 2010).

Joik is not a static tradition; it is a practice that differs between the Sámi regions, is constantly changing, and holds different meanings to different people (Jouste, 2009). As with Sámi conceptions of knowledge, joik is closely connected to practices and traditions, and it is not possible to give a comprehensive overview of all aspects. I will focus on two perspectives on joik that informs my understanding of playing the violin in violin lessons: joik as performative, not representative, and joik as a reciprocal gift.

Hilder (2014) describes joik as "a way of naming and remembering people, and of bringing life to places, animals, and other aspects of the environment" (p. 5). This naming and remembering is performative, not representative.[55] Ánde Somby, himself a joik artist, articulates the nature of joik like this:

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55   As an example of a joik connected to place, the joik of the village Máze (Masi in Norwegian) performed by the group ISAK, can be listened to here: https://youtu.be/0osRNg4nkSg.

Yoik is distinguished from everyday singing in several ways. For instance, one does not yoik *about* someone or something, but one simply yoiks someone or something. In a manner of speaking, a yoik has no object. In fact, it is altogether impossible to envision yoik in terms of subject and object. The yoiker may perhaps be considered an integral part of the yoik, and this has interesting connotations for the debate about objectivity in research. To what extent is the researcher a part of his research, and how far is the research part of the researcher? (Somby, 1994, p. 15)

In this text, Somby relates to the fundamental question of subjectivity and objectivity, of outside and inside, also raised by Barad and other feminist new materialists and posthumanists. If Somby's text is read through agential realism, then joik could be said to be a phenomenon that is constituted by the entanglements of the person joiking, the animal, person, or place that is joiked, and the joik itself. Furthermore, joik does not rely on the human–nonhuman binary.

There are Yoiks for persons, animals and land. In Saami tradition it was very important for a person to have a yoik, just as important as being given a name. Yoiking a landscape or an animal probably had a similar ritual significance. Even for the trained ear, it is difficult to hear the difference between an animal's yoik and a person's yoik. The reason is simply that people, animals and land are not as distinct in the Saami mind as in the western European mind. (Somby, 1994, p. 16)

In being given a joik, humans, animals, land are coming into being. The most common way of getting a joik is from a parent or close relative. "If someone yoiks you out of love for you, you are linked to society at large and to the line of generations; this way, you have received a new identity and a new name" (Hirvonen, 2010, p. 95). The practice of joiking is a practice of reciprocity. Being joiked and passing on the gift of joiking others are ways of creating community not only among humans but also among places and animals and spirits.

How Does Sámi Studies Matter?

Sámi studies and, in particular, Sámi conceptualizations of knowledge and music, exemplify ways of thinking about these topics that differ from conventional humanist ways. The Sámi entanglements of knowing, being, and values, and the way Sámi scholars use particular concepts and their practices to think with and through, serve as inspiration for doing something similar with agential realist ethico-onto-epistemology and music education concepts and practices. The Sámi concept of joik as relational, not representational, creates an opening for rethinking violin lessons as a phenomenon consisting of humans and nonhumans; land and places; and pasts, presents, and futures.

Through engaging with Indigenous and Sámi studies, and with intersectional feminism and affect theory, I have followed the dis/continuous strings between these areas and agential realism. In the following and last section, I re-turn to agential realism and briefly explore what agential realism might become when intra-acting with Indigenous and Sámi studies, intersectional feminism, and affect theory.

Re-Turning to Agential Realism

What is agential realism becoming when intra-acting with Sámi studies, intersectional feminism, and affect theory? It is easy to read answers to such questions as a critique of what agential realism was before read through these theories. But that would imply a dichotomous understanding of difference and a linear concept of time. As a generative alternative, I suggest asking *what else* agential realism might become through this reading.

The full answer to this, or at least a fuller answer, will be offered in the diffractive reading of stories through agential realism, Sámi studies, intersectional feminism, and affect theory in the second half of the dissertation. But for now, I would like to suggest three possible expansions. Affect theory offers a broader understanding of the multitude of forces that work with and between bodies; intersectional feminism offers a broader understanding of the workings of social categories on, with, and in bodies; and Sámi studies offer a broader understanding of the entanglements of knowing, being, and music. In the following chapter, I explore the possibilities for doing inquiry while thinking with these theories.

Chapter 4: Diffractive Storytelling

As I introduced in the previous chapter, music is never fixed in one place; it is always on the move, always changing, always reinvented. So is methodology. Although it might seem like a century-old stone castle, qualitative methodology is a quite recent invention (Koro-Ljungberg et al., 2018; St. Pierre, 2019a, 2019b). Qualitative methodology might be better likened to a tent rather than an old castle. Even though it is a big tent, supple enough to accommodate interpretive, emancipatory, and critical inquiry, qualitative methodology is still a temporal construction built for "research that begins with the humanist subject" (St. Pierre, 2019b, p. 4).[56] What methodologies then are possible after posthumanism and its concept of a differentially constituted (Barad, 2007) and nomadic subjectivity (Braidotti, 2013)? If humanist qualitative research methodologies cannot accommodate what is often called "the posts"—postmodernism, poststructuralism, post-epistemologies, and posthumanism (Lather, 2016; St. Pierre, 2019b)—or "the new" of new materialism and new empiricism (MacLure, 2013a; St. Pierre et al., 2016), then what practices of research become possible to do?

The aim of this chapter is to explore the possibilities for doing inquiry offered by feminist new materialism and posthumanism, Sámi studies, intersectional feminism, and affect theory when read through one another, and to relate these possibilities to my overarching aim of investigating how violin lessons are enacted and what they produce. First, I turn to postqualitative inquiry. This alternative to qualitative inquiry offers the possibility of taking the reading of theory rather than already existing methodologies as the starting point for doing inquiry. Framing this inquiry as a postqualitative inquiry allows me to fully explore what thinking with agential realism might produce. After discussing postqualitative perspectives on data, objectivity, and validity, I move on to storytelling practices. From the beginning of this project, it was clear to me that grappling with the enactments of violin lessons must involve other forms of text besides transcripts of spoken words and those that rely on habitual academic language. Thus, I turn to feminist and Sámi practices of telling stories and discuss how stories can change worlds. Then, I return to diffraction, the physical phenomena so important in agential realism, and discuss its implications for research.

I end this chapter by exploring how postqualitative inquiry, storytelling, and diffractive research might work together in this particular inquiry, and I suggest the practice of diffractive storytelling—the practice of telling diffractive stories and reading them diffractively through other texts—as a useful way of engaging with how violin lessons are enacted and what they produce.

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56   The tent metaphor for research is also used, in a different way, by Sámi scholars (Porsanger & Seurujärvi-Kari, 2021).

But before engaging with the possibilities offered by postqualitative inquiry, storytelling, and diffractive research, I will briefly justify why I have chosen diffractive storytelling over other research practices.

But Why Not …?

There are qualitative research methodologies used in music education that could have been generative in this inquiry. Of these, narrative inquiry would have been particularly apt as it also focuses on the various aspects of storytelling (Barrett & Stauffer, 2010a). I have chosen not to engage with narrative inquiry as I find the anthropocentric and representationalist assumptions in narrative research to be all-encompassing and incommensurable with the theories I think with. One example that encapsulates many of the humanist assumptions within narrative inquiry is found in a book on narrative inquiry in music education:

> Perhaps the most enduring description and understanding of narrative is as "story," an account to self and others of people, places, and events and the relationships that hold between these elements. The capacity to speak, and, through that medium, to construct a version of events, is a distinguishing human trait. (Barrett & Stauffer, 2010b, p. 7)

In this quote, the assumption that the narrative represents the event is implied, not explicitly stated. I infer the representationalist logic in this quote in how it expresses a binary understanding of self and others and of relationships as something that holds different elements together. It is the separation of the world into pre-existing entities that makes representations possible. The second implication of representationalist logic is expressed in the statement that stories are accounts to self and others—of people, places, and events and their relations. In the act of accounting for something, there might be an assumption that one thing can capture or represent another thing. This "other" is the narrative, a linguistic and discursive account that separates ontology from epistemology by mediating the knower (the human writing or reading the narrative) and the known (the event or reality narrated). Furthermore, the capacity to construct narratives is considered a distinguishing human trait, and the narratives themselves are concerned with humans. Narrative inquiry builds on a representationalist logic that separates ontology and epistemology and centers humans. This differs from the posthuman onto-epistemology of agential realism outlined in the previous chapter.

So why do I not merge these differences into something generative? Researchers have done so with success before. There are scholars thinking with posthumanism and new materialism that have chosen to reconceptualize qualitative research in generative and inventive ways (e.g.,

Ellingson & Sotirin, 2020; Jackson & Mazzei, 2012; Koro-Ljungberg, 2016). Why go all the way and frame this inquiry as a postqualitative inquiry and to venture into storytelling and diffractive readings rather than narratives and analysis?

As with the decision of thinking with agential realism or taking up the violin, the decision of doing a postqualitative inquiry could not be said to be a purely rational decision by an individual human. Throughout this chapter, I will argue that diffractive storytelling is a useful way of exploring the questions of how violin lessons are enacted and what they produce. But there is also a feeling of urgency guiding my methodological considerations. On a global level, we are living in the midst of a climate crisis that has already irrevocably changed the world. To continue doing anything as usual, including research, seems out of place. Why do more of the things that brought us here?

On a more generative level, the meagre prospect of securing a job in academia after graduating, coupled with uncertainties about whether I want to, along with the pull of returning to working with children and music suggest that this might be the best (possibly) only opportunity to undertake an inquiry of this nature and scale. To echo the words of Dolly Parton (when asked about her extravagant looks): "I think I could get away with less. But I like more." (*At Home with Dolly Parton in 1982*, 1982).

That is not to say that I refuse all qualitative research. Thinking with Barad's concept of agential cuts cutting together-apart and creating dis/continuities (Barad, 2007, 2010, 2014; Juelskjær & Schwennesen, 2012), I find it possible to draw on qualitative scholars while framing the present inquiry as a postqualitative inquiry.

Postqualitative Inquiry

In the second chapter, I argued that music education is anthropocentric and builds on a representationalist logic. This leads to research predominantly interested in humans—primarily adult humans—and their words. Furthermore, this research predominantly relies on discourse-oriented analysis of data comprising written words without questioning the categories of humans or data. In music education, to name the anthropocentrism and representationalism of qualitative research is rather novel. In the larger field of qualitative research, this is old news. For a long time, scholars have claimed that qualitative research methodologies are dominated by representationalist thinking, making them unsuitable for researchers thinking

with post- theories such as postmodernism, poststructuralism, post-epistemologies, and posthumanism (Lather, 2013, 2016; MacLure, 2013a; St. Pierre, 2011).

The term "postqualitative inquiry" was introduced by St. Pierre (2011)[57] as a way of thinking and doing research with postmodern philosophy. Postqualitative inquiry is suggested as an alternative that offers the possibility of taking theories, not methodologies and methods, as its starting point, and of experimenting and reinventing with and through research (e.g., Lather & St. Pierre, 2013; MacLure, 2013a; St. Pierre, 2011, 2020). To term this dissertation a postqualitative inquiry signals to the reader that the qualitative assumptions they might have brought to the reading will be challenged. Postqualitative inquiry is "something different altogether and cannot be recognized and understood in the same grid of intelligibility as those methodologies" (St. Pierre, 2019b, p. 5). Starting from a thorough reading of agential realism, I use postqualitative inquiry to attune the research apparatus—the way I perform this inquiry—to the particularities of the entanglements at hand (Barad, 2007). Thus, the entanglements of violin lessons, not conventional methodologies, guide this inquiry.

As I wrote in the introduction of this chapter, I do not reject the value of qualitative research that thinks with post- theories. Rather, I conceptualize the relationship between qualitative and postqualitative research as one of dis/continuity. One example of this is found in the book *Thinking with Theory in Qualitative Research: Viewing Data Across Multiple Perspectives* by Jackson and Mazzei (2012). The book's title states that it is a book on qualitative research, and the authors introduce the philosophers they draw on (including Barad) as poststructuralists. Thus, the authors clearly position their work in a qualitative and poststructuralist tradition. Nevertheless, their work and, in particular, the phrase "thinking with theory" have gained widespread use in posthumanist and postqualitative work. Also, their approach to research—a plugging in of one text into another inspired by Deleuze and Guattari—shares similarities with what Barad calls a diffractive reading (Barad, 2007).

However, I do not take the postqualitative rejection of methodology to be a rejection of conversations concerning methodological questions. Rather, I take it to be a rejection of separating methodologies from other aspects of inquiry and an invitation to more closely connect methodological questions to both ethical and ontological questions. When questions concerning ethics, ontology, and epistemology are not confined to a section of a methodology chapter, but rather turned over and over in all aspects of the doings of inquiry, they take on

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57   St. Pierre uses inquiry and research interchangeable in this early article. In later works, she uses inquiry (e.g., St. Pierre, 2019b). Although St. Pierre writes "post qualitative," I have chosen to write "postqualitative" to align to the spelling of posthumanism.

a greater scope and importance. Thus, when I in the following section engage with some key methodological concepts, they are not done once and for all.

Data Reworked

In qualitative research, data are predominantly considered mute and passive as they are collected through one of a series of recognizable methods and then subjected to analysis that creates meaning from the "raw" data (Koro-Ljungberg et al., 2018). The conception of data as "original" or "innocent" is connected to the realist idea that there is a reality out there that we, as researchers outside the reality, might observe.[58] This conception of data is present in the way music education research commonly collects, transcribes, codes, and analyzes data before presenting results.[59]

The ontological turn and its rejection of representationalism raise the question of how the ontology of data—what data is and what data does—could be reworked. The diverse approaches to research referred to as the "ontological turn" have challenged conventional conceptualizations of data by rejecting the binaries of nature/culture, nonhuman/human, and matter/discourse, and by emphasizing the intra-actions and entanglements that produce the world (e.g., Barad, 2007; Haraway, 2016; Koro-Ljungberg et al., 2018). This reworking was initiated by poststructuralist thinking that inspired a problematization and destabilization of data by suggesting alternatives such as transgressive data (St. Pierre, 1997), agentic data that glow (MacLure, 2010, 2013a), or data that create wonder (MacLure, 2013b). The troubling of conventional conceptions of data has taken several directions, and it is beyond the scope of this chapter to explore them all. Rather than give a brief and general overview of data after the ontological turn, I engage in-depth with one article to illustrate how data can be reworked and what this reworking does to knowledge production.

In their paper "PhEMaterialist Encounters with Glitter: The Materialisation of Ethics, Politics and Care in Arts-Based Research," Coleman and Osgood (2019) return to a research workshop they held together. The workshop invited the participants to work with glitter and to reflect on the material and affective properties of glitter—to explore what glitter does. The paper written in connection to this workshop explores not only what glitter does but also what the authors do with what glitter does. In other words, what researchers do with data and data with researchers.[60]

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58   The "God trick" or the idea of a neutral observer is critiqued by, amongst many other, Haraway (1988).

59   See Ski-Berg (2022) or Tahirbegi (2022) for two of many recent examples.

60   "Data" is not used as a term in the paper, but I use the term here to connect to the topic of reworking data after the ontological turn. Whenever used, "data" in the following sections refers not to conventional qualitative data but to data reworked or data+ (Koro-Ljungberg et al., 2018).

Theories might "block the reproduction of the bleeding obvious" (MacLure, 2010, p. 377). Coleman and Osgood (2019) write that they conscientiously chose feminist new materialist theories for their paper to connect to the feminist argument that research methodologies and practices are entangled with questions of ethics, politics, and care. The feminist new materialist theories take part in the production of data in many ways. One is by allowing for the preparation beforehand and tidying up afterwards to be part of the research. Engaging with not only the workshop but also the preparation and afterwork of it makes visible some of the often-hidden feelings and labors of academic work and knowledge production. The authors connect this to racialized and gendered structures in academia, and, thus, the theories expand what counts as data and what knowledge the research produces.

Another way that the theories move the knowledge production beyond reproduction is through not relying on linear time. New materialism conceptualizes time as nonlinear and as entangled with space and matter (Barad, 2007). Thus, data also become nonlinear, and time might speed up, slow down, or take unexpected turns. Koro-Ljungberg et al. (2018) suggest that the relationship of time and data could be multidirectional, and that they might flow, mingle, and play with one another. This is done by Coleman and Osgood (2019) as the text moves through different temporalities, weaving time and data together in multiple ways rather than relying on linearity.

The theories also guide the researchers toward the agency of more-than-humans. Coleman and Osgood (2019) describe how glitter took part in producing data through evoking affects, arguments, and associations told by the participants, through materializing into different art assemblages, and through sparking conversations. The conversations, happening both in the workshop and in social media, concerned the production of the glitter, child labor, working conditions, and pollution. By including these conversations, data expand beyond being confined or produced within the room of the workshop, as the global economy and environment become part of the data. Another way that data in this article is expanded occurs through including pictures of the workshop activities in the article.

The reworking of data made possible after the ontological turn, exemplified by engaging with a PhEMaterialisms article, opens up exciting possibilities for doing research. Postqualitative inquiry argues for letting a thorough reading of theory guide the engagement with data (St. Pierre, 2020). This particular inquiry is guided by readings of agential realism. Barad writes that "the specificity of entanglements is everything. The apparatuses must be tuned to the particularities of the entanglements at hand" (Barad, 2007, p. 74). As a part of the attunement to the particularities of the entanglements of this inquiry, I conceptualize the audio recordings, field notes, sheet music, diary entries, and stories as materialized entanglement. These

materializations were not already there, waiting to be found, nor are they my constructs. They materialize through intra-actions, and their material form is fluid and changing. This reworking of data (could everything be data?) is relevant for questions of objectivity and validity.

Objectivity and Validity Reworked

The split between objectivity—questions of how or to what degree an observation is affected by the observer—and validity—questions of how and to what degree the knowledge produced through the observation is valid—relies upon the Cartesian split between subject and object, knower and known. The critique of realism, universalism, and individualism postulated by poststructuralists and feminists in the late 1980s made it possible to imagine other and more complex understandings of the relations of nature and culture and, thus, of questions of objectivity and validity (e.g., Haraway, 1988; Lather, 1993).

Question of validity—the condition of the legitimation of knowledge (Lather, 1993)—is central to all practices of knowledge production. As with the qualitative concept of data, the concept of "validity of correspondence" often used in qualitative research relies on a representationalist worldview where a "view from everywhere" (Lather, 1993) or "god trick" (Haraway, 1988) creates the conditions of objectivity. Poststructuralism offers a shift from a validity of correspondence asking if the world is sufficiently represented to a validity of transgression or "a nonreferential validity interest in how discourse does its work" (Lather, 1993, p. 675).

Barad (2007) and other feminist new materialist and posthumanist thinkers build on poststructuralism when they refuse representationalism and proclaim that the world is not made up of subjects and objects. Rather, Barad argues, the world is performatively becoming, and the basic ontological unit is phenomena—the ontological inseparability of intra-acting agencies. Thus, questions of validity move from questions regarding the accuracy of representation to questions around being response-able for the part we play in the world's materialization. As the two-slit experiment demonstrated, the properties of an entity—whether it is a particle or a wave—is indeterminate before the measuring is done, and the parts of a phenomenon are becoming through intra-actions. Thus, questions of validity concern how apparatuses are "tuned to the particularities of the entanglements at hand" (Barad, 2007, p. 74).[61]

Rather than aiming for objectivity and validity as understood by qualitative research, researchers must be response-able (Barad, 2012, 2014, 2021) for their part in the world's becoming. I aim to be so by being accountable for the role of the apparatus or "the material conditions of possibility and impossibility of mattering" (Barad, 2007, p. 148) in this inquiry and by

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61 Accounting for how this is done in the present inquiry is the main objective of Chapter 5.

"attending to specific practices of differentiation and the marks on bodies they produce" (p. 232). Part of this accountability entails listening to and taking into account critiques of the theories and practices that constitute the possibilities and impossibilities for mattering in this inquiry. In the following section, I engage with some of the critiques of postqualitative inquiry.

Critiques of Postqualitative Inquiry

Postqualitative inquiry is critiqued for positioning itself as *not* qualitative inquiry and thus upholding the binary way of thinking that post- theories critique (Gerrard et al., 2017; Koro, 2021). This way of thinking links to Western binary thinking and to a colonial logic of progress along a linear path. To respond to this critique by asking whether it is valid or not, would be to continue the binary thinking that is critiqued. As an alternative, I try to respond to the critique by framing it as a generative provocation. How might I enact this inquiry as a postqualitative inquiry while not rejecting qualitative research? As mentioned earlier, one approach is to use Barad's concept of dis/continuity (Barad, 2010; Juelskjær & Schwennesen, 2012) as a way of conceptualizing the relationship between the two. This approach acknowledges the creativity and innovation of postqualitative research while not erasing its entanglements with qualitative research. Another approach is to argue for the use of a postqualitative approach to inquiry by exploring the possibilities within this paradigm, not by refusing the possibilities of qualitative research.

Related to the critique of postqualitative inquiry's claim to be "new" is the critique raised by scholars concerned with the implications of white and powerful academics disrupting essentialist thoughts or questioning the authenticity of voices "when so many voices are always already erased from the histories of the world" (Bhattacharya, 2021, p. 181). Bhattacharya critiques postqualitative researchers, especially posthumanist researchers, for decentering humans without taking into account that all humans are not equally centered. She goes on to ask "how and for whom does a specific work function? Whom does the work include, and whose history and materiality are excluded?" (p. 182). These questions are important to bear in mind, and I find that they resonate with Barad's insistence on the need to be responsible for the part we play in the world's materialization. Although I aim to decenter humans in my research, I also try to be mindful of the importance of humans and their identities and to trace the many intra-actions that constitute their differential subjectivities.

Another critique, also related to the new-ness and white-ness of postqualitative inquiry, is raised by Hokowhitu (2021). He points to the problem of building something "new" on an almost exclusively white, male European tradition of thought. Especially when doing so erases a strong tradition of Indigenous thought, much of it done by women and people of color.

Although directed toward new materialisms, Hokowhitu's critique is a pertinent reminder of how the canon of postqualitative inquiry is not innocent or neutral. Postqualitative scholars (e.g., St. Pierre, 2020) argue strongly for a thorough reading of poststructural philosophy to reorient thought. The philosophers mentioned are often Deleuze and Guattari, Foucault, and Derrida, all of whom are white, dead, and male. Without dismissing these philosophers' important works, scholars working within the tradition of postqualitative inquiry must be mindful of the all-encompassing tendency in our culture to erase the contributions of women (Sieghart, 2021) and people of color (Ahmed, 2012). Scholars must actively work against this tendency, or the odds are high it will continue.

One important reason I decided to use agential realism as my main theoretical framework was its potential to connect to other fields of research and worldviews. I try to respond to the critiques of postqualitative inquiry by engaging with feminist and Indigenous works in a respectful and generative ways, and in particular by engaging with feminist and Sámi storytelling traditions.

Storytelling

Stories are everywhere. We tell stories, we think stories, we live stories. To explore all of their aspects and all of their functions is beyond the scope of this chapter. Here, I will focus on how stories work in two particular research traditions—feminist and Sámi storytelling traditions—and how they, in different ways, offer an escape from the geometrical trap (Barad, 2003) of representing reality.

In research, there is a widespread assumption that fact and fiction or true and imagined stories, are oppositions (Haraway, 1989). If approached through the binary lens of fact versus fiction, research could be thought of as primarily concerned with documenting facts (Gough, 1998) or representing reality. But there is no definite line between true and imagined stories when writing educational research. By changing names for pseudonyms, by including and excluding details, by putting complex situations into neat sentences, we are always writing fiction to some degree (Gough, 1998). Building on Barad's ethico-onto-epistemology, I suggest that the stories I tell in this dissertation are performative and relational stories, not representationalist stories. They do not represent a reality already there, but they take part in the intra-active becoming of the world. I expand on this claim in the last part of this chapter. But first, I discuss how stories matter before moving on to feminist and Sámi stories and how they matter.

Stories That Matter

As will become evident through this section, stories in both feminist and Sámi storytelling traditions matter. But they do so in slightly different ways. The feminist storytelling I engage with, builds on the storytelling of Ahmed (2012, 2017), Haraway (2016, 2019), and Le Guin (1986/2019). Although their stories differ, the authors share an ambition for telling other stories than the dominant stories, and, through their other stories, changing the world.

The Sámi storytelling tradition I build on, particularly the stories of Turi (1910/2012), takes a slightly different approach. These stories seek change, but they are also told to engage with the world that is already here and to make it tangible and knowledgeable to Sámi and non-Sámi people. The Sámi stories I have read stem from a living oral storytelling tradition of a people that have been and still are subjected to colonizing. Thus, the stories are also stories that aim to preserve worlds that currently exist but are under threat.

What the two storytelling traditions share is the idea that there's always a story and that to change the story is to change the world (Pratchett, 2005). I intuitively agree with this. But how do stories change the world? How does it matter "what stories make worlds, what worlds make stories" (Haraway, 2016, p. 12)? As I escape the representationalist trap, I move into a realm of fiction, fabulation, and affects where the aim of stories is not to represent, interpret, construct, or explain reality. Rather, the aim is to be attentive to and responsible for how stories matter in material, discursive, and affective ways. Stories create intensities and emotions; they create knowledge, insights, experiences, and traditions; they materialize through symbols, actions, and metaphors. I will give two examples of how stories matter before discussing how this mattering is connected to, but not dependent on, human agency and intentionality. I start by telling a story of a story.

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When I grew up, I had no friends in walking distance from my home. To entertain myself after school hours, I had only one TV channel, and I didn't have a smart phone or computer. I spent my afternoons reading and playing music. By luck or necessity, I loved both. I had meters and meters of bookshelves at my disposal filled with plenty of children's books. But as I grew older, I started flipping through the adult books—the ones with no pictures and long words. One of the books that caught my attention was *Egalias døtre*[62] written by Gerd Brantenberg.

As a child, I read the book as a story about a young boy called Petronius Bram and his experiences growing up in Egalia, a place that I took to be located in the undefined "abroad."

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62   *The Daughters of Egalia* in English.

"Abroad"—the mysterious location in many of the books I read—was quite similar to the Norway I knew but with some strange differences that I mostly ignored. I also ignored the many strange words. In that first reading, I was still a child that had no conception of metaphors or allegories, and most of my attention went toward the act of putting the letters into words.

Although the letters forming words and sentences where the same the second time I read it, the story I read took a completely different form.

When I read the book as an adolescent, *Egalias døtre* became a feminist satire telling the story of a society run by women oppressing men. The young boy, Petronius Bram, goes through an awakening as he identifies the sexist structures oppressing him, and he takes part in the forming of a men's rights movement. The many strange words that I accepted without understanding when reading the book for the first time started to make sense. They were all rewritings of words that originally centered men. A familiar word like "menneskelig" [human] was changed to "kvinneskelig." The suffix *-lig* refers to something being similar to something else. By changing the prefix from *menn-* [men] to *kvinn-* [women], the word "menneskelig" changed from an unquestioned term to a powerful statement about how being human is often conflated with being like a man.

It is no overstatement to say that the book changed how I understood the world I lived in. Since that rereading of Brantenberg's book, I have been a feminist.

It is easier to navigate the patriarchy when recognizing (some of) its structures and finding support in feminist communities. But being a feminist is also a bit lonely. Many years later, when I read Braidotti's (2013) book *The Posthuman*, I encountered the opening sentence. It states that "not all of us can say, with any degree of certainty, that we have always been human, or that we are only that" (p. 1). I breathed out a sigh of relief and felt a tingly impulse of joy. "You know it too," I thought, addressing Braidotti as if she were a friendly and familiar face in a crowd of strangers.

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Through reading a story that queered patriarchal words, my life changed. I gained tools for thinking and acting that have been with me ever since, especially in writing this feminist dissertation. The author Gerd Brantenberg is a leading feminist and lesbian activist who has worked in many ways, including in her writing, to dismantle the patriarchy. She has published a number of well-received books, and *Egalias døtre* (Brantenberg, 1977) became a bestseller in a number of countries (Nilsen, 2022.; Storvik & Ryste, 2003). I expect Brantenberg is aware of her agency as an activist and writer and of having intentions of influencing and changing society by writing stories in the way she does. In that sense, the way the book matters in my life is a result of an intentional act by Brantenberg.

But agency is not aligned with human intentionality (Barad, 2007), and the way stories matter goes beyond the intentions of the storyteller. The way the story of Petronius Bram matters in my life is not only an effect of the intentional writing of Brantenberg. It was also produced by my childhood boredom and easy access to books. The meters and meters of bookshelves in my home were connected to my middle-class background and the fact that my parents found it possible and important to buy books. Furthermore, how the story matters are entangled with the feminist movement of Norway and my engagement in it. How the story matters also changed with how my body changed. As my brain developed the ability to make abstract connections and understand Brantenberg's queering of words and gender, the story changed from a literal story of a society in the mysterious land of "abroad" to a satire commenting on the patriarchal society I was living in. And as my body changed from a child's body to a woman's body, my experiences of the patriarchy changed. Thus, the agency of the story goes beyond the intentions of the author and is entangled with matter, discourse, affects, bodies, and social structures.

Another example of how stories matter is found in present-day Thailand, where a hand signal from *The Hunger Games* trilogy (Collins, 2008, 2009, 2010) has become a part of student protests. As part of a larger movement for democracy, secondary students have developed an extensive national network to campaign against conservative norms and institutions. One of their campaigns targets the daily morning assemblies during which the national anthem is sung to show respect to the nation, to Buddhism, and to the royal family. During the assemblies of the summer of 2020, students in at least 200 schools nationwide protested against the government by raising their hand palm out and with three fingers pointing up (Lertchoosakul, 2021). The symbol has also been used by democracy movements in several other Asian countries (Richardson, 2021).

The hand symbol is a symbol from the dystopian novel series *The Hunger Games* by Suzanne Collins, published between 2008 and 2010. The series has gained enormous popularity both in its book form and in its filmed version. The story is set in Panem, a North American land divided into the wealthy Capitol and 13 districts. The districts, oppressed by the Capitol, are forced to send two children each year to compete in the deadly Hunger games. In the first book, the main character, Katniss Everdeen, volunteers to save her little sister. When asked to applaud this action, the population of District 12 protests by holding up three fingers as a symbol of gratitude and respect for Katniss's sacrifice. As the story moves on and Katniss Everdeen becomes a leader for the revolution, the hand symbol becomes a symbol of solidarity between the districts and of resistance against the Capitol.

The Thai students have adopted this hand symbol from a fictional revolution and used it in their own democracy movement to symbolize resistance and solidarity. The signal materialized from words on paper—via a film showed in cinemas—to the bodies of young protesters and has been part of a movement shaking the foundations of Thai society (Hui, 2020; Lertchoosakul, 2021).

The hand symbol from *The Hunger Games* is not the only symbol from popular culture that has been used by political movements (Hui, 2020). Some of the stories that have mattered, like *Egalias døtre* (Brantenberg, 1977) or *The Handmaid's Tale* (Atwood, 1985), are created by authors that have an outspoken intention to take part in the public debate concerning the themes of their stories (e.g., Atwood, 2022). What makes the symbol from *The Hunger Games* particularly interesting when discussing the relationship between the intentions of the author and the agency of the stories is that I have found no evidence that there is an intention from the author's side to create a symbol usable for Asian democracy activists. Thus, in the case of the hand symbol from *The Hunger Games*, the story and its symbols and meanings have taken on an agency that is independent of the intentions of the author.

The insight that stories matter, and that they might matter in ways not intended by the author, is an important part of the ethical considerations of this dissertation. As these two examples have shown, stories might take part in moving the reader or listener in affective ways. Stories might move our understandings of societal and linguistic structures, leading to a lifelong engagement in feminist thinking and to the writing of a feminist dissertation. Stories might take part in social movements, moving whole societies in other directions by disseminating symbols, arguments, and shared references across time and space. Stories matter, but their agency does not align with the intentions of the authors. Nor do stories matter in causal or predictable ways. The agency of stories is agency becoming through intra-actions (Barad, 2007).

This insight reminds me that I cannot control how the stories of this dissertation matter. I am quite sure that they will have significantly less impact than the bestselling stories I have used as examples. But I do not know how they might impact a smaller part of the world called music education research. I have intentions of moving music education research toward paying attention to matter and doings, toward being more response-able for what it produces, and toward understanding knowledge as knowing-in-being. But I must remain open to the possibility that the stories might matter in ways unintended by me.

Feminist Storytelling

Egalias døtre (Brantenberg, 1977), the book that has mattered so much in my life, is part of a rich tradition of feminist storytelling. Many feminist scholars recognize the transformative power of telling stories to dismantle patriarchal (e.g., Le Guin, 1986/2019) and racist (e.g., Ahmed, 2012, 2017) structures. In the following, I engage with feminist storytelling and, in particular, the practice of SF suggested by Haraway (1994, 2016).

SF

Stories and their part in scientific practice and theory, as well as the relationship between fact and fiction, have been a part of the scholarship of Haraway for a long time. "A fact," she wrote back in 1989, "seems done, unchangeable, fit only to be recorded; fiction seems always inventive, open to other possibilities, other fashionings of life" (Haraway, 1989, p. 4). This interest in how fiction or stories might change the world has run through the work of Haraway until the present day (Haraway, 2019), and she has conceptualized her storytelling practice as SF.

SF is a concept on the move, it is moving and being moved, and it is related to diffraction—the mapping of interference (Haraway, 1992). In the paper in which she first introduced diffraction, Haraway writes that "SF—science fiction, speculative futures, science fantasy, speculative fiction" (Haraway, 1992, p. 300) is an especially apt figuration for conducting inquiries that are concerned with diffraction, not reflection and reproduction. In later texts, as SF moves in Haraway's thinking, its meanings expand to include string figures (Haraway, 2016). Haraway grapples with one particular game of string figuring, the Cat's Cradle, in some of her texts (e.g., Haraway, 1994, 2004), but in later works, she uses the term "string figures" (Haraway, 2018).

Haraway thinks of string figures in a triple sense of figuring. The first is as a method of tracing or following a string in order to find the tangles and patterns that are crucial for staying with the trouble. Our task, according to Haraway (2016), is to be capable of responding, of making kin, and of staying with the troubles, disturbances, and messes of the world. This is a practice of "promiscuously plucking out fibers in clotted and dense events and practices" (p. 3). By doing so, it is possible to track the threads and find the tangles and patterns "crucial for staying with the trouble in real and particular places and times" (p. 3). The second sense in which Haraway thinks of string figures is "not the tracking, but rather the actual things, the pattern and assembly that solicits response, the thing that is not oneself but with which one must go" (p. 3). In her third sense, "string figuring is passing on and receiving, making and unmaking, picking up threads and dropping them" (p. 3). Thus, string figuring is not something to be done alone; it is a relational practice, a practice of collectively making with (Haraway, 2018). These three figurations of string figuring share an interest in the entanglements—the

entanglements of the strings, the figure the entanglements make, and the entanglements of hands and strings.

Haraway defines SF as "a methodological proposal, a proposal of a cognitive technology" (Haraway, 2018, p. xxxviii). Furthermore, she suggests that the toolkit of SF, "a toolkit for thinking, feeling, storying, relating" (p. xxxviii), could be used, modified, shared, or done whatever with. I find this open, generative, and theory-driven approach to research to work well with the postqualitative rejection of methods and methodology (e.g., St. Pierre, 2019b) and with Barad's agential realism (Barad, 2007) as a way of *thinking with or through* rather than a guide on how to do research. Haraway's concept of string figuring inspired me to write Chapter 3 as a collection of knots rather than a linear explanation of agential realism, and to explore the entanglements of agential realism and affect theory, intersectional feminism, and Indigenous studies. The concept also inspired the tracing of the strings of violins that connects them to capitalist and colonialist economies, as well as to the gendered structures of Western music education, that I do in Chapter 8. Finally, Haraway's string figures materialize in the concept of *knots of knowing-in-playing* that I propose in Chapter 12.

Bag Lady Storytelling

Another practice of feminist storytelling, connected with many strings to Haraway's SF, is found in *bag lady storytelling* inspired by the essay "The Carrier Bag Theory of Fiction" by Ursula Le Guin (1986/2019). Building on Le Guin's bag lady stories, Haraway suggests that these stories are "stories of becoming-with, of reciprocal induction, of companion species whose job in living and dying is not to end the storying, the worlding" (Haraway, 2016, p. 40). This is an approach to stories that is mindful of the agency of stories, of how they might story the world differently. SF wordling is a contingent practice of "living and dying, of becoming-with and unbecoming-with, of sympoiesis, and so, just possibly, of multispecies flourishing on earth" (Haraway, 2016, p. 40). This emphasis on how stories might be a part of the becoming of other worlds affects what is included in stories. Rather than being bound and fixed, "bag-lady storytelling would instead proceed by putting unexpected partners and irreducible details into a frayed, porous carrier bag" (Haraway, 2008, p. 160). These unexpected bits and pieces might create stories with continuations, interruptions, and reformulations rather than fixed beginnings and ends.

Such stories hold the potential of troubling how we think of educational settings as being done by humans who share a fixed container of space—a classroom or a living room— and time—the time set aside in the schedule. In Chapter 6, I read stories from online lessons through Le Guin's (1986/2019) essay to develop the concept of *troubled togetherness*.

Feminist New Materialist and Posthumanist Storytelling

There are a number of feminist new materialist and posthumanist scholars working with feminist storytelling who create inventive and generative texts (e.g., Adsit-Morris, 2017; Niccolini et al., 2018; Osgood & Mohandas, 2020). One example of how feminist storytelling practices might materialize in education research is found in the work of Osgood and de Rijke (in press) with de Rikje's young neighbor Laura-Rosa. Through telling carrier bag stories, they reconfigure well-known figures in early childhood literacy such as "the book" and "the child" by engaging with the messy and unpredictable assemblages of not only books and children but also a nomadic lifestyle, lice, the scribbles from a previous reader found in the book, and Laura-Rosa's drawings of the chairs in which children read. These carrier bag stories hold the potential to resist the privileged notions of developmental standards that create failure, learning difficulties, and exclusion for many children, and to story worlds where the question of "what else?" moves researchers to pursue other ways of creating knowledge in literary studies and early childhood education (Osgood and de Rijke, in press).

In this dissertation, feminist storytelling such as the work referred to above, invites me to move beyond what I, when I first started on this inquiry, thought of as the boundaries of violin lessons. In the following chapters, I write about the students and teachers playing violin in the classrooms at the time set aside for the lessons; however, I also discuss how other humans, other nonhumans, other times, other places, and other matter are part of the stories I tell. I also explore how my engagements with the lessons materialized not only into transcripts of spoken words but also into diary entries from practicing, sound clips from thoughts that arose during walks, and sheet music scribbled on by generations of students and teachers.[63]

Although my understanding of the boundaries of violin lessons has changed through the course of this inquiry, my interest in learning, teaching, playing, and knowing has remained the same. To explore how stories might produce and hold knowing and knowledge, I turn to Sámi storytelling.

Sámi Storytelling

The Sámi have a strong tradition of telling stories as part of articulating and passing on their culture and their knowledge (Kroik et al., 2020). There is also a rich scholarly body of work that uses Sámi storytelling when exploring varied topics such as research-storying (Guttorm et al., 2021), stories in video games (Laiti et al., 2021), and traditional knowledge (Kroik et al.,

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63   The invitation to do all of this came from the reading of bag lady storytelling, from the gentle, but insistent, guidance of my supervisor Professor Jayne Osgood, and from the not-so-gentle, but very insistent, COVID-19 virus. I tell more of how this was done in Chapter 5.

2020). To ignore this tradition would be to take part in the silencing of Indigenous scholars done by postqualitative, new materialist, and posthumanist scholars (Hokowhitu, 2021; Rosiek et al., 2019; Todd, 2016). But words, concepts, and practices cannot be translated from one language and frame of reference to another without losing some of their function and power (Finbog, 2020). I am also aware that I, as a Norwegian scholar drawing on Sámi studies,[64] might be prone to appropriating Sámi culture in the way Norwegians and others have done so many times before (Nuorgam, 2021).

Although Sámi ways of thinking and articulating knowledge cannot be directly translated, they might be adapted and provide alternatives to Western scientific discourse (Gaski, 2017). In the previous chapter, I tried to engage with Indigenous scholarship in a respectful way by not conflating all Indigenous fields of study into one but, instead, specifically engaging with Sámi studies and its onto-epistemology; I was also mindful of my citational practices. In this chapter, I continue this effort by turning to a specific storyteller, Johan Turi, and his book *An Account of the Sámi*[65] (Turi, 1910/2012). By engaging with the nuances of his stories, rather than conflating a rich and diverse tradition into one, I aim to engage with Sámi storytelling in a respectful and generative way. Turi's book is considered one of the foundational texts in Sámi research (Virtanen et al., 2021) and is particularly apt for learning about the relationship between stories and practices of knowing for three reasons.

First, it is a work written by a Sámi author living in Sápmi[66] who writes in his own mother tongue. Turi had little formal schooling, and his writing is marked by its similarities to the oral style he might have told stories in (DuBois, 2012). In that sense, the text offers insights into oral Sámi storytelling that are different than those that might be found in a written re-telling of another person's stories. Second, it is a text that explicitly aims to communicate Sámi knowledge, and, therefore, it is reasonable to assume that it adequately conveys an understanding of how Turi and the Sámi community he was a part of conceptualize knowledge. In addition to his writings, Turi includes detailed drawings in his book. These complement the text and emphasize the entangled nature of knowing and being. Third, Turi´s book is also accessible to non-Sámi readers. The 2012 English translation is based on the original manuscript, and the translator DuBois worked closely with Sámi writers and joikers to try to deliver the nuances and beauty of the original work (DuBois, 2012).

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64   Although the two groups might have lived in the same area for a long time (Amundsen, 2017), there is no question that the Norwegian people and the Norwegian state have taken land, culture, and resources from the Sámi people. So, for all practical reasons, I belong to a settler population.

65   *Muitalus Sámiid Birra* in the original Sámi version.

66   The Sámi name of the region traditionally inhabited by the Sámi people.

An Account of the Sámi

An Account of the Sámi by Johan Turi (1910/2012) is the first secular book written by a Sámi author. It was first published in 1910 in a dual-language edition of Sámi and Danish and translated into a dozen different languages in the years that followed (Svonni, 2011). The book was republished in Sámi in 2010 to celebrate its 100th anniversary and in English in 2012 (Gaski, 2012). Before its publication in 1910, Turi's book was preceded by a few secular texts that built on the oral tradition of the Sámi (Porsanger & Seurujärvi-Kari, 2021). Turi's book distinguished itself from these early publications by being published in Turi´s own words and with his own drawings, and by closely following the oral tradition of which he belonged.

Johan Turi was born in 1854 in Guovdageaidnu[67] in Norway. His family members were Sámi reindeer herders. Due to the redrawing of boundaries between Russia, Finland, Norway, and Sweden in the late 1800s and early 1900s, Turi's family lost pastureland and had to move, first to Gárasvvon[68] and then to Čohkkiras[69] slightly further south (Cocq, 2008). Although Turi received no formal schooling, it was common for the Sámi to homeschool their children to teach them elementary reading skills. Turi's father had been a teacher, and his godfather was a pastor, later bishop. It would be reasonable to assume that they taught Turi to read and write in Sámi and Finnish (Kuutma, 2011).

Turi had a longstanding dream of writing a book, and he looked for a way of doing so for years (Kuutma, 2011). By chance, Turi met Emilie Demant, a Danish artist and ethnographer,[70] in 1904. Demant's longstanding dream was to live with a Sámi family for a year and to learn the Sámi language and culture. Turi arranged for Demant to stay with his brother's family and, in return, Demant helped Turi write and publish his book (Svonni, 2011). For two months in the autumn of 1908, Turi and Demant stayed together in a cabin in Torneträsk in Northern Sweden. Turi wrote the entire book in small composition notebooks and on loose pieces of paper (Svonni, 2011). Often, he would write a heading such as "About Sámi Songs" (Turi, 1910/2012, p. 181) and then fill in what he thought was important to say on the topic. Then, Demant would read the text. Sometimes she asked for clarification of words or practices and wrote his explanation in Danish in the margins. Other times, she used her knowledge of the Sámi language and culture to request Turi to write more about a specific topic. Demant edited and translated the book into Danish. After the duo lingual and illustrated edition was

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[67]   Kautokeino in Norwegian, a village in Northern Norway.

[68]   Karesuando in Swedish and Karesuvanto in Finish, a village located at the border in Northern Sweden and Finland

[69]   Jukkasjärvi in Swedish.

[70]   For an interesting account of Demant's extraordinary life and a discussion of the collaboration between her and Turi, as well as the role played by the industrialist and cultural preservationist Hjalmar Lundbohm, see Kuutma (2011).

published, Demant made sure that Turi´s original manuscript was preserved, and, thus, it could be consulted for the recent editions of the book (Svonni, 2011).

Turi's book is unique in its literary qualities and in its connection to the Sámi language and culture. It is written in Sámi, in a mixture of Guovdageaidnu and Čohkkiras[71] dialects, by a Sámi author who grew up listening to stories from people born at the beginning of the nineteenth century (Kuutma, 2011; Svonni, 2011). The writing style of Turi resembles a transcription of an oral account. He does not use periods or commas and hardly uses any capital letters. In the original manuscript, the text is seldom altered suggesting that Turi was a skilled and confident storyteller (Svonni, 2011). The book consists of shorter and longer stories and accounts with headings describing their contents. It starts with the oldest stories of the Sámi. Then, it follows a number of stories structured around the seasons of the year and the work that must be done when herding reindeer. Finally, it concludes with stories of hunting and trapping, healing and *noaidi*[72] skills, tales and songs. The last two sections are short and concern recent, political events. Turi uses a variety of voices and narrative strategies to create different levels of authority and to relate to the readers.

Turi was one of the first Sámi to work toward organizing his people in order to make their voices heard (Cocq, 2008), and the stories he told were connected to his political engagement. Turi wanted his stories to tell the Swedish government about the conditions of the Sámi, of their ways of living, so that the government could make better, informed decisions. In telling these stories, he resisted the colonial powers of the Swedish (and Norwegian, Finnish, and Russian) government(s). The decolonial power of Indigenous stories is recognized as a powerful tool. "Stories in Indigenous epistemologies are disruptive, sustaining, knowledge producing, and theory-in-action. Stories are decolonization theory in its most natural form" (Sium & Ritskes, 2013, p. II).

An Account of the Sámi has an outspoken intention of communicating Sámi knowledge. Turi opens the book by stating that "I am a Sámi who has done all sorts of Sámi work and I know all about Sámi conditions" (Turi, 1910/2012, p. 11). Reading this sentence through agential realism, it becomes a powerful statement of the entanglement of ontology ("I am a Sámi") and epistemology ("I know all about Sámi conditions") while also emphasizing the importance of practices ("all sorts of Sámi work") and how knowing, doing, and being are entangled. Turi gives his reasons for writing this book by stating that although the Swedish government wants to help the Sámi, "they don't get things right regarding our lives and conditions, because no Sámi can explain to them how things are" (p. 11). Read through agential realism, this statement connects

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71   Kautokeino and Jukkasjärvi.

72   Shamanic practitioner.

the onto-epistemology to ethics and to questions of response-ability (Barad, 2012,2014). Turi goes on to explain that when a Sámi is closed up in a room, his thoughts cannot fly, and his mind is closed down. "But when a Sámi is on the high mountains, then he has quite a clear mind" (p. 11). Thus, Sámi people are often misunderstood when talking to government officials in indoor meetings and the best way to explain Sámi conditions is to write a book so clearly that everybody can understand, including those who willfully misconstrue things to claim that only the Sámi are at fault in disputes with Norwegian and Swedish settlers. In this sense, Turi´s book is a part of a resistance toward the colonizing nations of Sweden and Norway.

But the book is also an affirmation and celebration of Sámi culture and ways of life. Or, as Turi puts it: "And it would be pleasant also for other Sámi to hear about Sámi conditions as well" (Turi, 1910/2012, p. 11). The use of the word "pleasant" (*hávski* in Sámi) connotes a state of things being right; of living a life of effectiveness and ease where things and people and reindeer are where they should be; and of being in a state of safety and abundance with plenty of food and shelter now and in the future (DuBois, 2011). Read with these connotations, the pleasantness that other Sámi people experience when listening to an account of Sámi conditions takes on a meaning that goes beyond the simple meaning of pleasure. To hear about one's own culture is a need, something that must be in place to live a safe life.

Another facet of meaning is created by the word "hear." Given Turi's masterful use of the Sámi language, the use of the word "hear"—not "read" as one might expect in a written book—seems intentional. It connects the book to the oral storytelling tradition of which Turi was a part. According to Cocq (2008), Turi was a storyteller who navigated his subjective preferences, interests, and intentions using the norms and traditions of Sámi storytelling as well as considering the audience of his book.

When Turi's stories are read through agential realism, they become stories of knowing-in-being. I read them as written from an ethico-onto-epistemology that entangles ethics, knowing, and being; that performs, rather than represents, knowledge; that views knowledge as done in intra-actions; and that recognizes the ethical response-ability entailed by knowing. In Turi's book, this is expressed in the way he weaves ethics, knowledge, and being together in the stories in ways that emphasize the situated and relational aspects of knowing. One example of this is found in the stories where Nuvtte, "the wisest man around in those days" (Turi, 1910/2012, p. 187), figures. Nuvtte's knowledge is performed through stories of how he, in deeply ethical and responsible ways, guides and helps the other members of the party while they travel together. Turi does not state what Nuvtte knows; he tells how Nuvtte does the knowing. Simultaneously, Turi performs his extensive knowledge of Sámi conditions by describing the construction of the harness of a reindeer as it is put on before the journey

starts or by inserting a little explanation of why they stop (to let the reindeer pee to prevent urinary blockage). This also exemplifies the intra-active nature of knowing. Knowledge is not to know *of*, it is to know within. To know is to be attuned to multispecies becoming through entanglements, to intra-act with bladders and access to water, the temperature, the time, the landscape and the shelter it offers, the customs of where and when to visit family, and myriad other humans and nonhumans. Thus, I read the stories as performative and relational stories, and I find inspiration in them while writing my own diffractive stories.

Turi's stories also engage spirituality. Although Turi introduces the oldest stories of the Sámi by saying "it is not certain whether they are true, since they haven't been written down before" (Turi, 1910/2012, p. 13), he uses the same authoritative voice to relate stories about mythical creatures, as to fauna, recent political events, and customs. This is connected to the Sámi understanding of true stories. In Sámi culture, *muitalus* names a true story such as the story

> about the time when the Creator placed the living and beating heart of a two-year-old reindeer cow at the center of the Earth, so that every time the Sámi felt their future and their existence threatened, they could just lay their ears to the ground and listen for the heartbeats from below. If the heart was still beating, that meant there would be a solution to the problems, and that there was still a future for the Sámi. (Gaski, 2019, p. 263)

Muitalus is connected to the North Sámi verb *muitit*, which means "to remember." This term can refer to the meaning of stories that are a combination of collective and personal memories (Cocq, 2008). *Máinnas*, on the other hand, are made-up stories (Gaski, 2019). I find this way of conceptualizing truth intriguing and generative: Truth exists not as question of correspondence with "real" events but as a question of collective memories and conceptions. This notion of truth allows for nonrepresentational stories that perform, rather than represent, knowledge in relational ways, and it has inspired how I have written the stories. The stories of this dissertation were read and commented on at different stages of writing by the teachers of the lessons. Through this process, the stories become "true" in a relational and responsible way, although they are not "true" in a representationalist way. The representationalist worldview is also troubled by the concept of diffraction.

Diffraction

In the previous chapter, I engaged with diffraction as a physical phenomenon and its role in the agential realism of Barad. In this section, I turn to the possibilities created by a diffractive research practice. But first, some words on visual metaphors and the most common of them in research: reflection.

Dating back to the Greeks, metaphors connected to vision are often used when discussing questions of epistemology and methodology (Barad, 2007; Levin, 1993). We *look* for different *perspectives*, we *cast light* upon that which we *focus* on, and we *reflect* while trying to avoid the pitfall of being *one-eyed*.[73] Representationalism—the idea that words or ideas can reflect or represent the things they refer to—connects well to these metaphors and has led to the ideas of the reflexive researcher and of reflexive methodologies that, in various forms, dominate educational and social science research methodology (Bozalek & Zembylas, 2017). Reflexivity is part of research on teacher education (e.g., Beauchamp, 2015; Hatton & Smith, 1995). In music education research, reflexivity is seen as an essential element of inquiry for researchers seeking to position music education as a practice for working toward social justice (e.g., Hess, 2018; Laes, 2017; Lewis & Christophersen, 2021). Reflexivity is also found in research on music education (Georgii-Hemming et al., 2020), and on music-teacher education (Angelo & Georgii-Hemming, 2015; Kallio & Westerlund, 2020).

Post- theories (e.g., Lather, 2016) and the movement to decolonize methodologies (e.g., Smith, 2021) have troubled the idea that to be a reflexive researcher is enough. Relating these thoughts to music education, Kallio (2021) questions whether reflexivity directed inwards—toward the researcher self—is able to dismantle inequitable power structures. Positioning reflexivity as a ruin, Kallio suggests working with reflexivity as a form of listening, and as an invitation to engage in risky methodological work that might generate new engagements with meaning-making and the transformation of ourselves.

Another take on the limitations of reflection is to look for concepts either replacing or complementing it. Undurraga (2021) is concerned with the rejection of the "old" in favor of the "new," and she suggests merging reflection with diffraction into a diffracted reflexivity. On a similar note, Barad suggests that "diffraction can serve as a useful counterpoint to reflection" (Barad, 2007, p. 71). In music, counterpoint is when two or more musical lines are played or sung at once. Each of the melodic lines in a counterpoint are at the same time independent and interdependent. When listening, I can direct my attention to the individual parts, following a

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[73]   You might have noticed that I experiment with other metaphors in this dissertation. I *make tangible* rather than *make visible* and I turn my *attention* rather than my *gaze*.

separate line for a while before turning to another; I can listen for how the relationships between the melodies are creating harmonies; or I can turn my attention to the boundary-making practices of the melodies and notice how a melody might give space to another and then claim that space back again. By thinking of the relationship between reflection and diffraction as a counterpoint, I can escape the trap of rejecting a practice found useful for many researchers while allowing myself to be "lured by curiosity, surprise, and wonder" (Barad, 2012, p. 207) by the concept of diffraction. In the following section, I explore diffractive research practices.

Diffraction as a Research Practice

Diffraction is the mapping of interference (Haraway, 1992) committed to understanding "which differences matter, how they matter, and for whom" (Barad, 2007, p. 90). It is a practice emerging through intra-action and, in particular, through the intra-actions of Barad and Haraway. Although Barad (2007) attributes diffraction to Haraway, Haraway nuances their account of the genealogy of diffraction when asked whether Barad picked up the use of diffraction from her or not.

> Partly, but also from herself, from physics, and much earlier than 2014. She ended up developing diffraction with a depth and precision that was further and deeper than mine. But in the beginning, I think Karen was pushed to look at diffraction in significant part because I was using diffraction in the way I use it in this book, as a material semiotic enactment, not an illustration. And then she ran with it. There's a lot of relationally entangled collaborative joint and independent work here—in Karen's terms, **intra-action**. (Haraway, 2018, p. xlvi, emphasis in original).

In these two quotes, the collaborative and entangled nature of diffractive research becomes visible. Barad (2007, 2014) also emphasizes that the non-binary understanding of differences that is central in diffractive methodology owes a thick legacy to feminist theories of differences as well as to quantum physics. Thus, a third entanglement could be traced to feminists, in particular feminists of color, like Trinh Minh-ha and Gloria Anzaldúa and their conceptualizations of *difference*. Diffraction is a conception of non-binary differences that are "not opposed to sameness, nor synonymous with separateness" (Trinh, 1991/1997, p. 416). This troubling of the very notion of dichotomy—the possibility of cutting into separate and mutually exclusive parts—is done by both feminist theory and quantum physics and enables a new understanding of differences.

Diffractive research is research attuned to differences and to what gets made by differences. But difference is not something that is fixed or given; it is done or performed. "Diffraction is not

a set pattern, but rather an iterative (re)configuring of patterns of differentiating-entangling" (Barad, 2014, p. 168). The diffractive patterns map "where the effects of difference appear" (Haraway, 1992, p. 300). Thus, diffractive research practices are concerned not only with differences as such but with how they are made and the effect they make. They are concerned with differences that matter and interested in understanding how they matter and for whom. One of many examples of diffractive research is found in the work of Osgood et al. (2016). They use diffractive practices to transform "uncomfortable, predictable and depressing" data on female academics and their experiences as working mothers into texts, poems, and pictures. The engagement with the seemingly ordinary reconfigures motherhoods in academia and produces other ways of understanding the production of power in academia.

Diffractive Readings

MacLure (2010) argues that theory has the potential to "block the reproduction of the bleeding obvious, and thereby, hopefully, open new possibilities for thinking and doing" (p. 277). One way of working with the generative potential of theory is by diffractively reading insights "through one another in ways that help illuminate differences as they emerge: how different differences get made, what gets excluded, and how those exclusions matter" (Barad, 2007, p. 30). To the best of my knowledge, Barad coined the term "diffractive reading" in their 2003 paper "Posthumanist Performativity" and developed it further in their 2007 book *Meeting the Universe Halfway*. From the early 2010s, the term was taken up by, amongst others, educational scholars (Ceder, 2016; Hognestad & Bøe, 2012; Hultman & Lenz Taguchi, 2010; Larson & Phillips, 2013; Lenz Taguchi, 2013; Palmer, 2011), and now, in the early 2020s, diffractive readings have become numerous.

The differences that emerge through diffractive readings—the diffractive patterns—are not what was already there *in* the text. Nor are they the sum of the two texts added together.[74] The intra-acting texts create possibilities and impossibilities for new insights rather than reveal what was already there. This research practice resembles and differs from qualitative analysis.

Barad (2007) writes that "the mutually informative methodology of diffractively reading texts (theories) through one another is a particularly apt form of analysis for agential realists" (p. 444, footnote 436). From this, I gather that Barad sees diffractive reading as a form of analysis. Mazzei (2014) also uses the term "analysis" in connection to diffractive methodologies:

> A diffractive analysis is not a reduction of data using a series of concepts, much like coding would require. Rather, it takes a rhizomatic (rather than hierarchical

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74   The understanding of differences as co-constitutive, not additive, is shared by intersectional feminism.

and linear shape) form that leads in different directions and keeps analysis and
knowledge production on the move. (p. 743)

The interchangeable use of diffractive analysis and diffractive reading in the literature suggests
that this practice, like so many other aspects of post- theories, relates to established research
practices in a dis/continuous way. Diffractive research breaks away from and continues from
established practices. Next, I focus on two areas where I find diffractive readings to be of
particular interest for my inquiry. The first is by troubling what is taken for granted and the
second is by enabling the reading of other media besides academic texts.

Diffractive readings offer possibilities for disturbing what is taken for granted. Reading
texts through one another allows new insights to emerge. One example of this is found in a
diffractive reading of an event that occurred during a workshop for new teachers exploring
their encounters in practice (Lambert, 2021). Through reading one teacher's account of her
first year of teaching through Barad's concept of spacetimemattering (Barad, 2007), Lambert
opens up for nonlinear and nonbounded understandings of teaching where time, place, race,
affects, matter, and power intra-act. Through this reading, it becomes possible for teacher
educators and students to grapple with the complexities of teaching in ways other than those
offered by reflective research that privileges cognitive and linear logics.

Diffractive readings also offer possibilities for reading different forms of text and different
media through one another. Diffractive readings do not take one text, often the transcripts
or notes thought of as "data" in qualitative research, as an object to be analyzed. Rather, none
of the texts are considered a priori, and the attention is turned toward the differences that
appear between them and how they matter. One example of this is found in a paper by Osgood
and Giugni (2015) in which text, video, photo, sounded poetry, and original artwork form an
assemblage. Through a diffractive practice that reads all of these different media through one
another, the authors explore what is counted as valid knowledge, and they create spaces for
"generative kinds of knowledge-making practices about gender in early childhood" (Osgood
& Giugni, 2015, p. 357). Diffractive readings do not necessitate a hierarchical organization of
data that privileges the words of the adults over the movements of the children or the swish-
ing of a dress. This opens up for other ways of exploring the complex entanglements of the
world. I have conceptualized the way I try to do so as diffractive storytelling.

Diffractive Storytelling

The aim of this chapter is to explore the possibilities that feminist new materialism and post-humanism, Sámi studies, intersectional feminism, and affect theory read through one another offer for doing inquiry and to relate these possibilities to my overarching aim of investigating how violin lessons are enacted and what they produce. So far, I have positioned this inquiry as a postqualitative inquiry that takes theory, not pre-existing methods or methodologies, as its starting point, and I have explored storytelling traditions and diffraction as a research practice. How might these approaches to doing inquiry work together and how might they contribute toward investigating the enactments and productions of violin lessons?

Asking how violin lessons are enacted calls for ways of grappling with the query other than those provided by transcripts of the words of adult humans. To ask how violin lessons are enacted is to ask about not only the humans and their words but the whole phenomenon of the lesson, which includes so much more than words. In violin lessons, there are sounds of music, of the cleaner's trolley, and of playing children. There are affects moving between bodies, sometimes through the intake of a breath and sometimes through a stuttering sound in Zoom. There are missing stickers, scary spiders, and sheet music marked by generations of students and teachers. Stories and storytelling offer a way of engaging with the more-than-humans and more-than-words that take part in the enactment of violin lessons.

The second part of the question concerns what violin lessons produce. This could have been answered in ways that took causality for granted. However, when thinking with agential realism and Barad's reworking of causality (Barad, 2007), the world is becoming through intra-actions, and the possibilities and impossibilities for becoming are iteratively reconfigured. Thus, to grapple with this question requires a research practice that is attentive to becomings and differences. Diffraction as a research practice is suitable as it directs our attention toward differences that matter and asks how the differences matter and for whom.

Thus, diffractive storytelling—the practice of telling diffractive stories and reading them diffractively through other texts—is a useful approach for grappling with the question I ask. In the previous sections, I engaged with storytelling and with diffractive readings. In this next section, I explore the possibilities for doing inquiry offered by the concept of diffractive stories.

Diffractive Stories

In the story of this inquiry, the term "diffractive stories" first came up in a meeting with my supervisor Professor Sidsel Karlsen in 2019. At the time, it was an original idea sparked by

our discussions and articulated by her. Because the twists and turns of doing inquiry made it clear to me that this would become an important concept, I did a literature search and found that several scholars had engaged with diffractive stories before me. This was a pertinent reminder of the dis/continuous nature of doing research.

The first paper using diffractive storytelling that I know of is one that investigates the function of fiction in curriculum inquiry (Gough, 1998). Since that paper was published, several educational scholars have worked with diffraction and stories in various ways. One example exists in a doctoral dissertation where Rath (2015) explores how stories are used in teacher education. She suggests diffractive storytelling as a way of telling stories that are intelligible to the reader while relating the messiness and materiality of teaching. A similar approach is used by Moxnes and Osgood (2018) in their diffractive reading of sticky stories.

Diffraction is a core concept of Barad's agential realism, and they connect diffraction, although briefly, to storytelling.

> There is no 'I' that exists outside of the diffraction pattern, observing it, telling its story. In an important sense, this story in its ongoing (re)patterning is (re)(con)figuring me. 'I' am neither outside nor inside; 'I' am of the diffraction pattern. Or rather, this 'I' that is not 'me' alone and never was, that is always already multiply dispersed and diffracted throughout spacetime(mattering), including in this paper, in its ongoing being-becoming is of the diffraction pattern. (Barad, 2014, pp. 181–182)

Although Barad, to the best of my knowledge, does not explicitly discuss storytelling in the rest of their work, they often use stories and storytelling when writing. They tell stories of such events as their own experiences with microscopes and atoms (Barad, 2007, pp. 39–40) and of how a cigar of bad quality took part in the demonstration of space quantization (pp. 161–168). They also diffract their texts through stories and other texts such as poems, novels, and plays (e.g., Barad, 2007, 2014, 2017). And, although not explicitly connected to stories, they attend to the affective aspects of theorizing in passages such as this:

> Theorizing, a form of experimenting, is about being in touch. What keeps theories alive and lively is being responsible and responsive to the world's patternings and murmurings. Doing theory requires being open to the world's aliveness, allowing oneself to be lured by curiosity, surprise, and wonder. (Barad, 2012, p. 207)

Here, Barad engages with the way theorizing, like storytelling, is affective. It is about being moved—being lured by curiosity, surprise, and wonder—and being open to the aliveness and

agency of the world. Based on these aspects of Barad's writing, and the generative work I find being done by the concept of diffractive stories in this dissertation and in other scholarly work, I find the practice of telling diffractive stories to be a useful approach to doing research. In the following section, I expand on how diffractive stories are performative and response-able.

Performative and Response-Able Stories

After the ontological turn, we need to find other ways of conceptualizing data, truth, objectivity, and validity. Inspired by other scholars engaged with these questions (e.g., Coleman & Osgood, 2019; Koro-Ljungberg et al., 2018; MacLure, 2010, 2013b), I try to do so by framing my stories as performative stories. There is another logic to performative stories, one that is different from the qualitative logic of progress relied on to find (realism) or create (constructivism) better, deeper, and more valid knowledge. Performative stories are worlding practices (Haraway, 2008) taking part in the world's differential becoming (Barad, 2007). Performative stories are attuned to the possibilities of becoming and the responsibilities we have for what comes to matter. They ask, "what else?" (Osgood & de Rijke, in press) rather than "is it true?"

Like I wrote when discussing how stories matter, their mattering is not causal. It is created through intra-actions. These intra-actions include, but are not limited to, human intentions. Thus, the intentions of the humans telling stories are part of the agency of the stories, but they are not the only part. Sometimes, as with the hand signal of *Hunger Games*, stories matter in ways not possible to predict. To frame stories as performative, not as true, might seem like an easy way out of questions of validity and objectivity. But I find it more difficult to write stories when I cannot hide behind the claim that I am just relaying what happened. To understand stories as performative calls for a more complex understanding of the ethical considerations of doing research. In the following chapter, I engage with the specific choices I have made during this inquiry and how they have mattered.

But to know how science, or stories, matter is not enough. The point is, Haraway writes, "to make a difference in the world, to cast our lot for some ways of life and not others" (Haraway, 2018, p. 36). I notice how Haraway points out that to make a difference is not enough. We must also choose what ways of life we make a difference toward. We must take sides, cast a lot. We must be responsible and accountable for our part in the world's becoming (Barad, 2007). But as I discussed in the previous section, how stories matter is connected to, but not dependent on, the intentions and agency of the author. How might we be response-able for how stories matter when stories have an agency on their own?

In this chapter, I have explored the possibilities for doing research offered by feminist new materialism and posthumanism, Sámi studies, intersectional feminism, and affect theory, and I have related these possibilities to my overarching aim of investigating how violin lessons are enacted and what they produce. In a keynote, St. Pierre emphasized the importance of reading hard, thinking hard, and writing hard (St. Pierre, 2022), and all through this chapter, I have done so. But I have also learned that I value a fourth aspect: doing hard. By that, I do not mean that reading, thinking, and writing are not doings. By doing, I mean doing the particular thing that the inquiry concerns—doing violin lessons and engaging with their teaching, learning, and knowing; violins, viruses, and sheet music; and children, teachers, and parents. An important source for this insight is the writings of Turi (1910/2012). Turi performs his extensive knowledge through the stories he writes in a masterful way. That is not to say that a researcher can only do research on topics that they also practice. However, being a violin teacher and violin player investigating violin lessons, as well as the agential realist rejection of the subject/object binary, have spurred me to consider questions of response-ability in other ways than I imagine a research topic more distanced from my professional life would have done.

This understanding of the entanglement of the researcher subject and the object of research is not only found in agential realism. TallBear (2014) argues for a feminist-Indigenous approach to inquiry. She points to how the concept of "giving back" to the communities in which one does research assumes fixed boundaries between researcher and the research object. Rather, TallBear suggest to "stand with" as a way of conceptualizing the entanglement of the researcher and the researched.

"Responsibility entails an ongoing responsiveness to the entanglements of self and other, here and there, now and then" (Barad, 2007, p. 394). My ongoing responsiveness has been shaped by the knowledge that I am entangled with the humans—the teachers, students, and parent—of this inquiry, and also with the schools of music and performing arts as well as with music education in general. The teachers participating in the study, as well as their colleagues, have been and will continue to be part of my professional network. Although being a violin teacher can sometimes feel lonely, there are many occasions shaped by cooperation within and across SMPA where we rely on each other for organizing concerts and rehearsals, and where we share a stage and rely on the skills and goodwill of the others in front of an audience. If I fail to be able to respond in a way that the teachers participating in this inquiry recognize—if I write stories they do not recognize as relevant or respectful, if I fail to communicate the process of the inquiry clearly, or if I do not value their time and effort—I might lose the trust of my colleagues. This also extends to the participating students and their parents. It is possible, although not very likely, that they might become my students one day or play

with my students, or that we might meet in an orchestra or at a concert. And these entanglements also include the nonhumans of the study albeit in different forms. I have been, am, and will be part of SMPA and music education, and the way this dissertation might take part in shaping its future will also shape my future. We, humans and nonhumans, are entangled, and my ability to be response-able matters.

What Kind of Trouble Do We Want?

In this chapter, I have explored the possibilities for doing inquiry offered by feminist new materialism and posthumanism, Sámi studies, intersectional feminism, and affect theory when read through one another, and I have related these possibilities to my overarching aim of investigating how violin lessons are enacted and what they produce. I have discussed how postqualitative inquiry offers possibilities for taking theories, not methodologies, as a starting point and how storytelling offers possibilities for both bringing other worlds into being and for storying the worlds already here. I have engaged with diffractive research practices and their attunement to differences that matter, and I have brought all these together in the concept of diffractive storytelling.

A common theme in the varied fields of postqualitative inquiry, storytelling, and diffractive research seems to be that of trouble. Haraway insists on us staying with the trouble (Haraway, 2016), Barad troubles just about anything including time, space, and matter (e.g., Barad, 2017), and in every story, there is some kind of trouble happening. From my point of view, I see a broad range of trouble ranging from the global troubles of capitalism, colonialism, and climate crisis all the way down to the troubles of doing inquiry and grappling with how violin lessons are enacted and what they produce. As a source of comfort, I borrow the words of Pratchett (2002): "We´re in trouble anyway. … It's just a case of deciding what kind we want" (p. 221). In the following chapter, I give an account of the troubles of doing inquiry and how I decided what trouble to stay with.

Chapter 5: The Research Apparatus

This inquiry takes diffraction as its main practice of research. Diffractions are attuned to differences, to the relational nature of differences and to the effects of differences. The feminist conceptualization of difference (Barad, 2014; Haraway, 1992; Trinh, 1991/1997) does not figure difference as a matter of essence or determinism (the difference is what it must be) or as inconsequential (the difference could have been any other way as well). Nor does it figure difference as a matter of oppositions and hierarchies. Rather, differences are intra-actively becoming, and diffractive patterns "map where the effects of differences appear" (Haraway, 1992, p. 300). Furthermore, diffractions "highlight, exhibit, and make evident the entangled structure of the changing and contingent ontology of the world, including the ontology of knowing" (Barad, 2007, p. 73). Thus, diffraction is "an apparatus of investigation" (Barad, 2007, p. 73) that makes tangible the entanglements of the world *and* is an entangled phenomenon in itself or "an object of investigation" (Barad, 2007, p. 73).

Diffraction takes both forms in this dissertation. In the following chapters, diffractive stories and diffractive readings are our objects of investigation. In this chapter, I engage with diffraction as an apparatus of investigation. To build such an apparatus is hard work as the entanglements to be studied change with each intra-action (Barad, 2007).

> The point is that the specificity of entanglements is everything. The apparatuses must be tuned to the particularities of the entanglements at hand. The key question in each case is this: how to responsibly explore entanglements and the differences they make. (Barad, 2007, p. 74)

Research apparatuses are materialdiscursive, boundary-making practices "that are formative of matter and meaning, productive of, and part of, the phenomena produced" (Barad, 2007, p. 146). This chapter builds on the premise that the knowledge produced in this inquiry is not "about" violin playing, violin lessons, or music education. "We"—the violins, viruses, spiders, strings, students, teachers, theories, and researchers of this inquiry—"know because 'we' are *of* the world" (p. 185, emphasis in original). We are part of and productive of the knowledge produced. The aim of this chapter is to be response-able for my part in this process. This ethical accountability is directed toward me, the researcher. But the researcher subjectivity, as well as all subjectivities, is not an individual and bounded subjectivity. It is an entangled subjectivity differentially constituted through intra-actions (Barad, 2007) with theories, supervisors, viruses, and many other entities.

This chapter also builds on the postqualitative premise of replacing the research designs of qualitative methodology with a thorough reading of theory, and of being on the move and willing to react to and experiment with whatever becomes (St. Pierre, 2020). The research apparatus must be tuned to the particular material, spatial, and temporal entanglements of the inquiry being done. The refusal of fixed methodologies and the insistence on paying attention to the specificities of the entanglements at hand make a traditional methods chapter—one that ticks the boxes offered by qualitative methodology literature—lose its meaning. Thus, I have not written a traditional methods chapter. Instead, I take the quote from Barad referred to in this introduction as a guide. I start the chapter by introducing the inquiry done. After this introductory part, I explore the specificity of the entanglements—the entangled human and nonhuman agencies—of this inquiry. Then, I tell how the apparatus was tuned to these entanglements as they materialized into audio recordings, transcripts, diary entries, and sheet music. I end the chapter by accounting for how the entanglements and the differences they make were explored in a response-able way.

Introducing the Inquiry

I start this introduction of the research apparatus by giving an overview of what was done at various times. Then, I give an account of what the entanglements materialized into before explaining how this inquiry has changed from a qualitative to a postqualitative inquiry.

The Time of the Inquiry

Described using a linear and geometrical concept of time,[75] this project started in September 2018 when I began my four-year doctoral candidacy at the Norwegian Academy of Music, and it ended in December 2022 when I handed in the dissertation you are now reading.

2018

In the autumn of 2018, I started my candidacy, and I participated in the introductory courses that gave me the itchy feeling that led me to posthumanism and Barad. At this time, the inquiry was a qualitative inquiry informed by activity theory (Engeström, 2015). I spent quite a lot of time grappling with the research question. I had a wish to include music, matter, doings, and children in the inquiry, but the philosophies and methodologies available to me directed me toward words and adults. I applied for permission to collect personal data from the Norwegian Social Science Data Services (NSD).

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75 See "Temporal Entanglements" in this chapter for a topological exploration of the temporality of the inquiry.

2019

During the winter and spring of 2019, the agential realism I read transformed the project that I had been accepted into the program with, and I rewrote the project description, the interview guide, and the observation guide.[76] Although I found reading posthumanist philosophy exhilarating, it also made me feel like I had lost my footing. The little grasp I had gained while doing qualitative research evaporated long before I was able to grapple with posthuman and postqualitative inquiry. For quite a while, I felt like I had no concepts to think with and no language to express myself with. The trust and enthusiasm of my supervisor Professor Sidsel Karlsen made this process of transformation less daunting than it otherwise would have been. When I received permission from NSD to collect personal data,[77] I made contact with a local SMPA and with Marianne.[78] I observed concerts and lessons at the school where Marianne teaches, and I interviewed her in her home before and after the observations.[79]

In the autumn of 2019, I observed lessons with Astrid, and I went to a concert held by her string orchestra. I also started writing stories from the lessons held by Marianne, and I interviewed Marianne asking her about some of the stories. During this period, I kept reading and writing and letting the theories I engaged with move the inquiry in unexpected directions.[80] The movements of thoughts were aided by Professor Jayne Osgood, who became my co-supervisor during this period. Her experience in and insight into doing feminist new materialist and posthuman research were invaluable. She suggested that I keep a research diary containing not only text but also images, objects, and anything else that I felt might contribute toward the research.[81]

2020

The winter of 2020 brought some unsuccessful attempts to observe a third teacher before finally making arrangements with Linda. Then, the COVID-19 pandemic hit us in March 2020 and all face-to-face lessons were cancelled.[82] After some weeks, I was allowed to observe Linda's online lessons. I also interviewed Astrid and Marianne about their experiences of teaching online. Due to childcare responsibilities that increased as the schools closed, my candidacy was prolonged until October 2022.

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76   See Appendices 2–6 for the different versions of the guides.

77   See Appendix 1 for letter of approval from NSD.

78   The names used are pseudonyms. I expand on the process of obtaining informed consent before collecting personal data in the section "Human Entanglements" in this chapter. See Appendices 7–9 for consent forms.

79   The practices of observing and interviewing are reworked in the section "Tuning the Apparatus" in this chapter.

80   I expand on this process in the section "Theoretical Entanglements" in this chapter.

81   I expand on these materialized entanglements in the section "Tuning the Apparatus" in this chapter.

82   How the pandemic affected the inquiry is expanded upon in the section "Viral Entanglements" in this chapter.

Although the activities that traditionally would be called "data gathering"—the observation of lessons and interviews with teachers—were conducted in the period between May 2019 and May 2020, the "data" did not sit still after that. The audio recordings, transcripts, sheet music, practice plans, notes, and memories I gathered bag lady style, and the stories that emerged from them, kept moving, and they moved my thinking and writing.

In the autumn of 2020, I had my midterm evaluation with Professor Emeritus Even Ruud as a respondent. He encouraged me to reconsider my conceptions of the boundaries of violin lessons and to ask where, when, and by whom they are done. This was an important step toward asking the question of how violin lessons are enacted and what they produce, and it helped me expand how I wrote the stories.

2021

During the winter and spring of 2021, the toll of the pandemic started to slow down my reading and thinking. When I did my trial disputation in June 2021, my respondent Professor Emerita Liz Jones managed to balance critical questions, useful suggestions, and encouraging words in a way that gave me new energy to continue working through the autumn of 2021. Her suggestion that I revisit my research questions, and the assertion that it was okay to let the questions I asked move around for a while longer, was most helpful.

2022

In 2022, I wrote, rewrote, turned, re-turned, and diffracted the dissertation-to-be with the help of my supervisors[83] until the text you are now reading became what could pass as a "finished dissertation." I sent the stories that made it into the dissertation to the teachers for them to read in August 2022 and received their comments in August and September.

The Materialized Entanglements

In this inquiry, as in many other feminist new materialist and posthuman inquiries (e.g., Coleman & Osgood, 2019), data is not conceptualized as something "out there" for the researcher to collect, analyze, and present findings from. Rather, data in its troubled form (Koro-Ljungberg et al., 2018) are intra-acting parts of the research apparatus. I conceptualize data as materialized entanglement—as the matter produced through the entanglements of the inquiry. I explore these materializations in detail later in the chapter. Here, I give a brief overview of their form and scope.

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83   I engage with the process of writing stories and reading them diffractively in the section "Exploring Entanglements" in this chapter.

Of the materialized entanglements, only the audio recordings contain personal data.

Audio Recordings and Transcripts

I audio recorded in total approximately 13 hours of lessons and 5 hours of interviews with the teachers. The lessons also included shorter conversations with the teachers while waiting for students to show up.

Names of teachers	Interviews	Lessons
Marianne	Three interviews, in total 2 hours and 45 minutes	Five lessons, in total 2 hours and 58 minutes
Astrid	One interview lasting 50 minutes	Five lessons, in total 2 hours and 13 minutes
Linda	One interview lasting 1 hour and 12 minutes	Seven lessons, in total 7 hours and 35 minutes

Table 1: Audio Recordings: Context and Duration

I asked the teachers if I could observe them with two or three students or groups of students. These tables show an overview of the observed lessons, rehearsals, and concerts, and the recordings and field notes that materialized.

	One month before	Week 1	Week 2	Week 3	Week 4	Week 5
Concert	Field notes					
Group lesson		Field notes	National holiday	Field notes	Field notes	Field notes
Sarah and Olivia		Both students present. Field notes	National holiday	Both students present. Field notes and audio recording (36 min)	Both students present. Field notes and audio recording (30 min)	Both students present. Field notes and audio recording (50 min)
Two students		Both students present. Field notes	National holiday	One student present. Field notes and audio recording (31 min)	Both students present. Field notes and audio recording (31 min)	No students present

Table 2: Lessons and Concerts With Marianne

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Quartet (including Nora)	All students present. Fieldnotes	Nora and one other student present. Field notes	All students present. Field notes			
Chamber orchestra	Field notes	Field notes	Field notes			
Concert			Field notes			
Two students				One student present. Fieldnotes	No students present	Two students present. Audio recording (57 min)
Nora				Audio recording (27 min)	Audio recording (26 min)	Audio recording (25 min)
One student				Audio recording (30 min)	No student present	No student present

Table 3: Lessons and Concerts With Astrid

	Week 1	Week 2	Week 3	Week 4	Week 5
Freya	Audio recording (61 min)	Audio recording (78 min)	National holiday	I was unable to attend the lesson	Audio recording (69 min)
Student	Audio recording (59 min)	Audio recording (62 min)	National holiday	Audio recording (70 min)	I was unable to attend the lesson

Table 4: Lessons With Linda

All of the audio recorded lessons were transcribed and engaged with,[84] but only the lessons with Marianne, Sarah, and Olivia (4 lessons), Astrid and Nora (3 lessons), and Linda and Freya (3 lessons) along with the rehearsals with the string quartet Nora played in (3 rehearsals) are included in the dissertation.[85]

Field Notes

I did not record situations in which I did not have consent from every person present to collect their personal data. Instead, I made field notes. These situations included orchestra rehearsals, group lessons, quartet rehearsals, concerts, and violin lessons. I wrote with pen in a notebook during the events. As soon as possible after the event, I typed the field notes into a Word document, adding details and thoughts. These field notes amounted to approximately 50 pages.[86] I also wrote approximately 15 pages of field notes accompanying the audio recorded lessons.

Google Keep Entries

In a Google Keep folder, I made 101 entries regarding the inquiry. These entries consisted of short memos I made to myself of things to remember, ideas to pursue, or woes to get out of my system. Many of these entries are accompanied by pictures of what I saw when making the entries—such as pages from books, the view at the time, or whatever household chore I was doing—simple drawings, or by audio recordings of my thoughts.

Journal Entries

I wrote 22 pages of journal entries relating to the research process, including my own practicing of the pieces the students played.

Sheet Music

I asked the teachers for the sheet music to the songs played in the lessons. This resulted in the sheet music of seven pieces ranging from short songs to a violin concerto.

Practice Plans

Linda wrote practice plans—notes for her students to use when practicing between lessons—and I asked her for copies of them. The practice plans consisted of four pages of handwritten notes.

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84   How this was done is described in the section "Exploring entanglements" in this chapter.

85   How I made this selection is discussed in the section "Excluding and Including" in this chapter.

86   All numbers of pages refer to text written in size 12 Times New Roman font and single spaced in Word.

Notes From Writing Stories

While engaging with the audio recordings and the transcripts, I wrote down questions, comments, and drafts of stories. This amounted to approximately 130 pages.

From a Qualitative to a Postqualitative Inquiry

As I wrote earlier, the present study started out as a qualitative study. St. Pierre (2019b) writes that "a study that begins as a qualitative study cannot be made post-qualitative after the fact" (p. 5). Did this mark the end of my endeavor into feminist posthumanism and postqualitative inquiry even before it began?

No, it did not. I do think a research project can move from a qualitative to a postqualitative approach to research when thinking of the move as a movement of dis/continuity. When I started this project, the little I knew of research told me that quantitative, qualitative, and mixed methods were the only options available. Qualitative research seemed the most suitable for my research interest, despite giving me an itch. When reading Barad, the itch was replaced by a feeling of having found my thing, my place in doing research. There are traces of the qualitative thinking in this inquiry—the past is never left behind (Barad, 2007)—but I do believe that it is also a fully feminist posthuman and postqualitative inquiry.

In the previous chapter, I wrote that methodologies are not given. Rather, they are products of philosophy, history, and politics, and they hold ontological and epistemological assumptions. This dissertation is a postqualitative inquiry as it takes the ethico-onto-epistemological arrangement of agential realism as a starting point for its methodology. Although the way I have conducted this inquiry bears similarities to commonly used methodologies in qualitative music education research, like in narrative inquiry or ethnography, the underlying ethico-onto-epistemological arrangements differ. Thus, I do not refer to methods literature concerning such methodologies. I have used qualitative methodology literature (e.g., Brinkmann, 2018; Kvale & Brinkmann, 2009; Silverman, 2021) as a guide to ensure relevant information is included in this chapter, but I do not use it as a guide for doing research.

The Specificity of the Entanglements at Hand

In this section, I take up Barad's claim that "the specificity of entanglements is everything" (Barad, 2007, p. 74), and I explore how humans—teachers, students, parents, and supervisors—and nonhumans—the COVID-19 virus, theories, and timespacematter—take part in

entangled doings. As in the chapter where I engaged with agential realism and other theoretical knots, there are no absolute boundaries in this inquiry. The entanglements could be thought of as string figures (Haraway, 2016) where the strings move in and out of figures and knots. The subheadings group the entanglements together in a move cutting them together-apart (Barad, 2007, 2014). These groupings could have been otherwise, and the subheadings are porous boundaries created by agential cuts not absolute boundaries. The topics of this chapter are connected to the chapters that follow, and I point to some of these topological connections in the footnotes.

I start this section with the temporal and spatial entanglements of the inquiry. Topological conceptualizations of space and time become possible when we abandon the ideas of space as a container in which independent objects move and of time as a unidirectional line. These topological conceptualizations turn our attention to questions of connectivity and entanglements (Barad, 2007) and enable ways of telling the story of how an inquiry was done other than through a linear narrative. After exploring the temporal and spatial entanglements, I engage with the viruses, the humans, and the theories and their entanglements.

Temporal Entanglements

In the beginning of this chapter, I gave a linear overview of the inquiry. That was not a lie nor was it an account of the process of doing inquiry that resonates with the agential realist notion of topological time. Barad (2007) suggests a topological notion of spacetimematter that pays attention to "questions of boundary, connectivity, interiority and exteriority" (p. 224) as intra-active becomings. Thinking with topological time, the doing of the inquiry moves in multiple directions and speeds creating multiple entanglements and boundaries.[87] Although later in the chapter I refer to different parts of the process, their temporal relations are not linear. I moved back and forth, or rather from here to there, turning and re-turning. These movements were not determined from the beginning nor were they arbitrary. They were moves responding to the entanglements at hand, the theories I read, the stories I wrote, and the intra-acting agencies of the inquiry. I will exemplify how the topological notion of time and its entanglement with human and nonhuman agencies are working in the present dissertation by exploring the dis/continuous movements of the questions I ask.

My area of interest, the knot of discourses, matter, and affects that constitute teaching, learning, and playing the violin, has been part of my life since I had my first violin lesson[88] and it

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87   The topological spacetimemattering of violin lessons are working through all the stories and are explored particularly in Chapters 6 and 7.

88   I told of how I became a violinist through the intra-actions of human and nonhuman agencies in Chapter 2.

has been part of my research interest since my master's thesis (Fjeldstad, 2017). This research interest has intra-acted with humans, with violins and bows (the story I told in the introductory chapter of how my new bow made the sixteenth notes acceptable to my teacher has revisited me many times) and with the norms of doctoral dissertations. It has also intra-acted with theories. How I articulate my interest through the words and thoughts available to me has changed throughout this inquiry. I have tried, tasted, tested, thought with, and thought through a number of different conceptualizations such as teachers' understandings of learning goals; what violin students are supposed to learn; and knowledge in music performance/activities/education. None of these ways of conceptualizing the project worked for me. For a while, I continued doing research and grappling with the materialized entanglements from violin lessons without having any research questions at all. Inspired by Professor Emeritus Even Ruud, I used the question of where, when, and by whom violin lessons are done and, later, I revisited the research question inspired by Professor Emerita Liz Jones.

The research question introduced in the opening chapter of this dissertation has come into being in a dis/continuous movement. It has evolved from a simple and unified understanding of the phenomenon in question (violin teachers' understandings of learning goals) to a more complex understanding (enactments and productions of violin lessons) in a continuous move as spurred by readings of agential realism and feminist new materialist and posthuman education research. In has also come into being through a dis/continuous process of discarding and inventing questions. For a while, I refused the concept of asking research questions altogether. Although the question guiding this inquiry—*how are violin lessons enacted and what do they produce?*—is sedimented through the words that sit still in my text, it is not a question that really sits still. Nor does it produce fixed answers. In the second half of the dissertation, I tell how the question produced concepts rather than answers.

Through exploring the dis/continuous movements of the research question, I have exemplified some of the temporal entanglements of doing inquiry, and I have grappled with how to specify the entanglements, realizing it is best not to pin them down but, rather, to follow their movements. In the next part, I engage with the spatial entanglements of the inquiry.

Spatial Entanglements

Barad's (2007) suggestion of a topological notion of spacetimematter that pays attention to "questions of boundary, connectivity, interiority and exteriority" (p. 224) as intra-active becomings has consequences for the role that spaces such as rooms, school buildings, and homes, as well as virtual spaces like Zoom meeting rooms, play in this inquiry. The COVID-19 pandemic did not create the topological notion of spacetimematter; it was already there.

But the pandemic forced me to take notice of it.[89] When violin lessons were moved to online platforms, I experienced other ways of being connected and disconnected, of sharing and not sharing spacetimematter with others, than I was accustomed to. I explore more of what the virus did to the inquiry in the next section. In this section, I turn to the spaces of the inquiry.

Marianne and Astrid taught the lessons I observed in elementary classrooms after school hours. Marianne used the same room for most of her lessons and had access to a couple of cupboards where she kept violins and sheet music. Astrid used multiple rooms at several schools during the week and did not have any storage facilities in the rooms. They both had to rearrange the furniture in order to make the room work for their lessons. The students came to the classrooms from an afterschool program or from their homes. Thus, both the students' and the teachers' personal belongings in the room were limited to what they could carry with them, and there were no decorations relating to music or violin playing in any of the classrooms.

When I first began this inquiry, I thought of violin lessons as happening in bounded spaces. But as my thinking changed, I started noticing how the boundaries of the lessons were becoming multiple times during the lessons. The doors were opened by other students and by a cleaner, and the windows were opened to let in air and closed to shut out sounds. The spatial boundaries of these lessons were also becoming in how the teachers worked with the furniture of the room to create a space for the lessons within the room, and by various instances of violins, students, and teachers entering or not entering, leaving or not leaving, the spaces of the lessons. In the online lessons, the multiple and porous boundaries of space became even more prominent as we—the researcher, teacher, students, and spiders of the lessons—shared and did not share our spaces. Although our sound and images froze and stuttered in different ways, making our online meeting rooms different, we were in them together while also being alone in our bedrooms, offices, gardens, and storage rooms.

The spaces where I did the writing of this dissertation, where I read, thought, wrote, and rewrote, have also played a part in its becoming. Throughout the process, I have written in multiple offices, in the storage room of the elementary school where I teach music, in my home, at the beach watching the sunrise, in libraries, and in multiple other locations. I do not know how the dissertation would have turned out if I had had another life with fewer other responsibilities than my research, but I think writing while on the move has contributed toward writing a dissertation that is also on the move.

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89   How the virus troubled the space and time of violin lessons is explored in Chapter 6.

Viral Entanglements

In March 2020, Norwegian society, as well as many other societies around the world, went into lockdown to prevent the spreading of the COVID-19 virus. This had a profound effect on this inquiry. The virus did much more than postpone some observations and interviews. As I explore in the stories based on the online lessons, the sudden change in the material conditions for the lessons troubled my assumptions of violin lessons and generated new ways of engaging with how violin lessons are enacted and what they produce. Thus, in line with the topological notion of temporality, the COVID-19 pandemic changed not only the parts of the inquiry done after its arrival but also the inquiry done before.

When writing of the lessons done during this period, I call them online lessons. This is a simplification that does not take into account the many and varied practices that intentionally involve teaching and learning with technology. The situation that emerged in March 2020 when lessons, without preparation, training, or adequate equipment, were moved to online platforms might be better termed "emergency remote learning" (Hodges et al., 2021). I have chosen to stick with online lessons and hope that my exploration of its many aspects make tangible how the situation of the spring of 2020 is not to be likened to all educational practices that take place partly or fully online.

The virus affected the process of doing inquiry in unpredictable ways. Some of them, like postponed lessons and the difficulties of working from home while my children were also at home being taught online, are easy to grasp. Others are more subtle, and I suspect that the full impact of the pandemic on the inquiry is still beyond my grasp. But I know that my thinking and writing were deeply affected by the fact that the world, as I knew it, had suddenly changed. It made me anxious and afraid; my thinking slowed down, and I would sit for hours staring blankly out of the window. It also spurred new thoughts related to the unpredictable, entangled, intra-active nature of the world, and I had to think about the relationship between acknowledging this complexity and trying to write texts that are comprehensive for a reader. This tension between mess and order, the unexpected and the expected, prompted me to be more mindful of how structures—including structures of dissertations —are agencies doing things and not absolute rules to follow.

Human Entanglements

One of the structures that had agency in this inquiry is the Norwegian Social Science Data Services (NSD).[90] I start this section on the particularities of the human entanglements of the inquiry by giving an account of how I navigated NSD's requirements for collecting personal data and how I kept the anonymity of students and teachers. Then, I explore how I created relationships with the teachers, students, and parents, which allowed me to enter their lessons.

The Norwegian Social Science Data Services (NSD)

NSD is a service providing researchers with solutions ensuring that the research is conducted in accordance with data protection legislation. Projects affiliated with institutions that have an agreement with NSD should notify NSD in advance when processing personal data. Personal data is any data that could be linked to a person, and audio recordings of a person's voice is considered personal data (*Notification Form for Personal Data*, n.d.). As I planned to record the lessons with audio and/or video, I notified NSD early in the process, and they approved my plans (see Appendix 1). In accordance with the legislation, I gave information about the project to the participants who would participate in the recordings (see Appendices 7–9). The teachers gave their written consent, as did the guardians of the students.

When I started planning this project, I wanted to have the opportunity to video record the lessons. I, therefore, included this option in the information letter and consent form that I gave to the students and parents. After doing a trial observation,[91] I found that writing notes gave me plenty of information to work with and that video recordings would require multiple cameras. I also realized that a camera would have directed what I saw and did not see in a way that might have made it harder for me to notice the unexpected doings of the lessons. Thus, I planned to use only audio recordings.

Although I discarded the idea of video recording, I kept the original information letter and consent form in case I later changed my mind. When I approached Sarah's[92] father to ask for his consent for her participation, he was hesitant to sign the form because of the mention of video recordings. I explained why I had kept it, and he signed the consent form, stating that he did not consent to video recordings. The conversation with Sarah's father led me to omit

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90   NSD merged with Uninett AS and The Directorate for ICT and joint services in higher education and research from January 1, 2022 and formed the Norwegian Agency for Shared Services in Education and Research (Sikt) (Organisational Changes at NSD, 2021). As the approval of this study and my subsequent inquiries were conducted by NSD, I will in this section refer to NSD, not Sikt.

91   During this trial observation, I did not collect personal data. Thus, it did not require approval from NSD. The teacher and students involved gave their oral consent for me to sit in on the lessons. The trial observation helped me plan the inquiry but is not included in the stories I tell.

92   A pseudonym for a student.

all mentions of video recordings. The different versions of the information letters and consent forms given to students and parents can be seen in Appendices 7–9. I contacted NSD about these changes and was told that it did not affect the approval given.

My engagement with human participants also included observations of group lessons, orchestra rehearsals, and concerts. As these events did not materialize into personal data, I was not required to gain the participants' consent. At lessons and rehearsals, I gave a brief oral introduction, explaining why I was there and what my project was about. At concerts, I attended as a part of the audience. The teachers and students involved in the study knew I was there, but I did not inform all persons present.

There were instances in which the voices of persons who had not given their consent to give personal data were taped on the audio recordings. These people included family members of the students, the teacher, and me as well as students whose participation was not originally planned to be a part of the study. I contacted NSD to ask how to approach these situations. Given the small scope and low degree of sensitive information from these events, I was advised that keeping the parts of the recordings containing these events would be in accordance with the legislation. I was also advised to use my professional judgement when deciding whether or not to contact those in question regarding their consent. I decided that the scope of their participation in the recordings, as well as the sensitivity of the information, is small and the level of anonymity[93] is high. Thus, I have not contacted them to ask for consent.

All audio recordings containing personal data, including those of online lessons, were made with an external recorder. In accordance with the legislation, the audio recordings are stored on my professional computer secured with a password and will be destroyed at the end of the project. Handwritten notes, notes made on my computer, and notes made with Google Keep do not include personal details of the participants and, thus, are not restricted by the legislation regarding storage.

When the COVID-19 pandemic forced the observations to move online, I contacted NSD. As the move did not affect how I collected or stored personal information, and as the Norwegian Academy of Music had a data processor agreement with the platforms in question, I was advised to continue the inquiry

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93   My family is of course not anonymous. They have given their consent for me to briefly include them in the recordings and in the dissertation.

Pseudonyms and Anonymity

To name the humans of the inquiry *Teacher 1* or *Student A* would not cohere with the literary style of the stories, and, thus, I have given all human participants pseudonyms. Names are an important part of how subjectivities are differentially becoming, and they hold different connotations and cultural meanings for different people in different contexts. How the names work for the reader is beyond my scope to predict in an accurate way, but I have tried to be mindful of how they might work by choosing names that are aligned with the gender, age, and ethnicity of the participants and by keeping in mind the associations that names might hold. In doing so, I used my judgement based on living in Norwegian society, and I consulted Statistics Norway's statistics related to names given to children in Norway over the past 100 years.

Questions of anonymity, like all questions, do not only concern humans. The humans in this study are entangled with homes, schools, communities, and institutions. Because lessons and interviews were conducted online, I had access to personal spaces like bedrooms and home offices. When describing these, I have omitted or changed details to keep them from being identifiable. I have also omitted or changed details concerning the schools, the local communities, and the institutions involved in the study.

When I first approached the teachers, I had agreed to send them the stories to ensure they were comfortable with the level of anonymity. In one instance, a teacher thought that my choice of a student pseudonym shared too many associations with the student's real name. The teacher initially asked me to change it and I agreed. After a couple of days, the teacher got back to me and advised that it would be fine to use the original pseudonym. Thus, I did.

In applying for and obtaining permission from NSD to collect and store personal data, in the communication with them to clarify questions regarding the unexpected persons who were taped in the audio recordings, and in keeping the anonymity of teachers and students, I made ethical considerations. But these are not the only ethical concerns that should be considered. Barad urges us to "responsibly explore entanglements and the differences they make" (Barad, 2007, p. 74). Thus, I continue this section on the human entanglements by exploring the entanglements of me, the teachers, and the students.

Teachers

Based on my experience as a violin teacher, I assumed that the material conditions for violin lessons differs and that these differences matter. Thus, my main strategy for including teachers in this study was that I wanted each of them to teach in different locations and settings. As explained in Chapter 2, the boundaries between SMPA, string orchestras, community music projects, and talent programs are fluid because both students and teachers may belong to

several of them at the same time. I wanted to recruit teachers working within the SMPA, but I did not make it a requirement that they only worked there, or that the lessons I observed were with students that were exclusively SMPA students. For practical reasons I limited the study to a SMPA located at a geographically accessible distance from my home. Guided by my supervisors and by my interest in examining the details and particularities of events rather than general tendencies, I decided that three teachers and their students seemed an appropriate number.

I made the initial contact with a school in the spring of 2019 in the form of a conversation with one of the leaders; I informed them of my project and my intention to observe lessons and interview teachers. Then, I extended an open invitation to all string teachers at the school to talk to me about the study and possibly participate. I received no replies. I also made inquiries among my day-to-day colleagues, asking them who they would suggest I talk to. Marianne's name was mentioned, and she willingly agreed to let me interview her and observe her lessons. Marianne teaches in an orchestra with a community music profile, and the students I observed were younger students. As I aimed to observe different lessons, I thought it would be interesting if the next teacher I engaged with was a teacher who mostly taught older and/ or more advanced students.

Based on conversations with colleagues and my knowledge of the violin teacher community, I approached two teachers that fit this profile. Both initially agreed but changed their minds early in the process, giving lack of time and mental energy as their reasons. I was left with a feeling that there was possibly more to their decisions. Not all violin teachers are equal even though we may be educated at the same institutions, work in the same city, or be employed by the same SMPA. I have experience teaching in community music and El Sistema-inspired projects, I have done a lot of group lessons, and I have worked in areas with a diverse population. However, I have not taught at prestigious summer courses or in talent programs, and I have not studied with the most influential violin professors in Scandinavia. The two teachers who refrained from participating in the study have a reputation for having very good students, and they teach in prestigious institutions alongside the SMPA. Although it was never articulated, I think our different teaching experiences impacted upon building relationships that might have led to their participation. Rather than being accepted as their equal within the violin teacher community, I suspect I was perceived as an outsider to whom they had no obligation to commit limited time and energy.

After these two failed attempts at finding teachers willing to participate, I asked Marianne if she could help me. She suggested Astrid who accepted my invitation right away. The interviews and observations with Astrid were very interesting and rich, but somewhat similar to

the ones with Marianne. Their students were approximately the same age and played at the same level. When I started working with the materialization of the lessons, I found them to be more diverse than I initially assumed. But at that point, I felt it was important to observe lessons with more advanced students as well.

Based on my knowledge of the teachers of the SMPA, I approached two more teachers who worked with advanced students. They were both positive, although one of them was very busy with personal matters and did not seem able to fit in a time for an interview. But Linda could, and I was very happy to set a time and date for our first interview and for the observations.

Then COVID-19 happened. With only a few days' notice, all schools, nursery schools, and SMPA across Norway closed in the middle of March 2020. The planned interview and observations with Linda were cancelled. After a couple of weeks, when the teachers of the SMPA had started giving online lessons, I approached Linda again. She was hesitant to let me observe her online lessons, and I did not push her as I respected her wish to protect both her and her students in an unknown and unfamiliar situation.

As I am a violin teacher myself, I participated in a Zoom meeting in April during which string teachers discussed online teaching and their experiences with it. This discussion raised many questions, and I became curious about how the teachers participating in my study had adapted their teaching to this new situation. I asked Linda, Marianne, and Astrid for individual interviews so I could learn about how they experienced the online lessons. After her interview, Linda volunteered with enthusiasm to let me observe her lessons. Although we were not complete strangers before the interview—we had met before in professional settings and as moms of playing children, and we had talked on the phone regarding my research project—I think the interview gave her the assurance she needed in order to be comfortable with me observing her lessons.

The three teachers that became a part of the study—Marianne, Astrid, and Linda—are all white cis women in their forties. Alongside the goal of engaging with teachers teaching in different settings, I originally wanted the teachers to have diverse backgrounds. I aimed to do so by approaching teachers from diverse backgrounds, and among those who declined were one teacher from a minority ethnic group, two men, and two older teachers. It is difficult to know to what extent my identity, I am a white cis woman that, at that time, was approaching my forties, affected the decision of the teachers. But I suspect that it did play a part alongside my reputation as a community-oriented, rather than a talent-oriented, teacher. All of the participating teachers are classically trained musicians, and in the lessons the students played Western classical music, Norwegian folk music, and songs connected to upcoming

holidays. This is quite representative of SMPA teachers' education, and of the repertoire used in the schools (Jordhus-Lier et al., 2021; Nielsen et al., 2022). It is difficult to imagine how the inquiry might have become something else if one or more of the teachers had been male or from a minority ethnic background, or if the repertoire of the lessons had been different. I would have gained insights into other parts of how violin lessons are enacted and what they produce, but I cannot know the potential scope of these other insights.

In August 2022, when the stories had taken shape and I had decided which stories would be included in the dissertation, I e-mailed them to the teachers and invited them to read and comment. One teacher gave her brief approval, another gave her approval alongside some comments regarding choice of pseudonyms,[94] and the third did not respond.

Students

I had expressed interest in observing a wide range of students when I had initially approached the teachers. The students participating in the study were suggested by their teachers after I indicated which days of the week I was available to observe. When choosing which students to ask, the teachers considered if the student would feel confident with a stranger present, if their plans for the student in the period of observation included working with sensitive issues, and if the student was likely to show up for the lessons. As far as I know, all students who were asked by their teachers agreed to participate. After the teachers had asked the students and the parents, I contacted the parents and gave them the letter of information with the consent form.

I approached some parents when meeting them at concerts or rehearsals. These parents signed the consent form then and there. The other parents received the information and consent form by e-mail. Some immediately consented while others did so after a reminder; some parents did not respond after several reminders. The students that had not given consent when I observed their lessons were given the information and consent form and asked to give them to their parents. In these cases, I did not record the lessons.

Researcher

I am a part of the inquiry, and I am entangled with all the other parts. Throughout this chapter, and the whole dissertation, I try to be response-able to my part in the world's becoming. In the sections above, I have discussed how my dual role as a teacher and researcher, as well as my identity as a white cis woman and as a community-oriented teacher, might have influenced how teachers responded to my request to observe their lessons. I have also discussed how the COVID-19 virus changed my spatial and temporal understandings, and how the pandemic and the measurements taken to prevent spreading the virus affected my ability to think and

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94   I expanded on this in the section on pseudonyms and anonymity.

write. In this section, I would like to consider how my violin playing body became entangled with the other agencies of the inquiry.

As I am a violinist and violin teacher myself, I found my body responding to the lessons I observed. These responses took the form of feelings and bodily sensations as well as communication through body language, and they are part of the stories I write. I experienced waves of feelings connected to events while writing these stories—such as fear when I wrote the story of the spider taking part in one of the lessons—and I found myself moving my arms and fingers while listening to students playing. I also found the teachers communicated with me through body language—through showing the bow hand or movement, assuming that I would recognize their point—rather than explaining it with words.

Theoretical Entanglements

My researcher subjectivity, including the theories I think with and through, is entangled with all parts of this inquiry. Barad's (2007) performative worldview and ethico-onto-epistemology inform how I write and think, and I engage with the entanglements of theory in all chapters of the dissertation. In this particular section, I turn to how the theories changed my intra-actions with the lessons and interviews. Later in the chapter, I grapple with how the theories informed the writing and reading of stories.

When first planning this inquiry, I had not encountered feminist posthuman and new material philosophies or postqualitative inquiry. Although I felt like there should be more room for music, children, and matter in my research, my initial plans were directed toward teachers and their understandings of what it is to know how to play the violin, and toward the learning goals of the curriculum framework. As I read theory and discussed it with my supervisors and others, the entanglements and nonhumans of the lessons became more prominent, and the adult humans and their words lost some of their privileged positions. Thus, when I started the second period of observation, I did not insist on conducting an interview beforehand when scheduling issues made it difficult. I did not plan to do so with Linda either, but the pandemic changed our plans. Thus, I conducted an interview with Linda (as discussed above) that led to her letting me observe the lessons.

The curriculum that was initially a part of my project was hardly mentioned by the teachers. This does not mean that the curriculum is not important in the enactment of violin lessons. But the multitude of other and more compelling agencies and entanglements that presented themselves, as well as the theory guiding me toward paying attention to mess, matter, and musical doings, led me to abandon further engagement with the curriculum.

The reading of theory also changed the interview guide and observational guide. Both of these documents were required attachments to the NSD application. The first time I wrote them, I was still thinking with activity theory. As I began thinking with agential realism, I rewrote them.[95] Later, in the sections on interviews and observations, I write about how these documents worked.

When tools and technology are mentioned in qualitative research, they are often given status as mediating tools doing work for the researcher. Their agency, what they do in the inquiry, is seldomly investigated. The agential realist theoretical framework allows for an investigation of the agency of the things of this inquiry. In the next section, I discuss how the research apparatus was tuned to the particularities of the entanglements at hand, including the material agencies such as computers and headphones.

Tuning the Apparatus

After exploring the entanglements of this inquiry, I re-turn (Barad, 2014) to the quote that opened this chapter, this time making a slightly different agential cut.

> Entanglements are highly specific configurations and it is very hard work building apparatuses to study them, in part because they change with each intra-action. In fact it is not so much that they change from one moment to the next or from one place to another, but that space, time, and matter do not exist prior to the intra-actions that reconstitute entanglements. … The point is that the specificity of entanglements is everything. The apparatuses must be tuned to the particularities of the entanglements at hand. (Barad, 2007, p. 74)

The hard work required to build apparatuses that are useful for studying particular entanglements demands attention to the specific entanglements as they change with each intra-action. This makes planning hard and following a plan even harder. When I first started my candidacy, I thought that it was a mark of success to conduct a study according to the plan. Now, I would consider doing inquiry without changes to the plan as a sign of not being attentive to the particularities of the entanglements. This change of heart comes from reading and discussing agential realism and other posthuman and new materialist theories, but also from

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95   As these changes did not affect the level of personal information collected, I was not required to send the new versions to NSD.

living through and with a pandemic for two years and experiencing sudden and unplanned changes on so many levels.

Thus, I do not see it as a flaw in the inquiry that I tuned the apparatus and changed plans as I engaged with the entanglements. Apparatuses "are constituted through particular practices that are perpetually open to rearrangements, rearticulations, and other reworkings" (Barad, 2007, p. 170). Furthermore, Barad (2007) writes that the creativity and difficulty of doing research is in trying to get the apparatus to work in a particular way for a particular purpose. In the following section, I explore how the apparatus of this inquiry was tuned to the particularities of the entanglements at hand. But because I think with diffraction and a performative worldview, this exploration is not done once and for all and then left by itself in a fixed form. Rather, the exploration continues in the stories I write. When exploring how violin lessons are enacted, I also explore the part the inquiry and the researcher played in their enactment.

Intra-Views

Interviews are a common form of collecting data in qualitative research (e.g., Kvale & Brinkmann, 2009). To think with agential realism and to attune the apparatus to the entanglements—including theories—at hand require me to rethink what interviews are and what they might do. Intra-view has been suggested as an alternative to the linear logic of interviews that involve one already existing person (the interviewer) asking another person (the participant) questions (Kuntz & Presnall, 2012; Warfield, 2017). Intra-views allow not only for the words and meaning to work, but also "the multiple bodies and material-discursive-affective forces" (Warfield, 2017, p. 68). One way these affective forces worked in the intra-views and conversations was when the teachers would tell me something about a student's playing, for example about their bow stroke, and use their bodies to communicate the movement. The teachers would express the quality of their movements in the way the joints worked together, the level of tension in the muscles, and the speed of the movement. Their movements worked in my body, activating my memories of doing similar movements. I term the talks I had with the teachers as intra-views to emphasize how they were events of material, discursive, and affective becomings rather than events during which bounded human subjects mediated their meanings through words. In the next section, I give a brief overview of how the intra-views were enacted. Some parts of them are explored in detail in the stories I tell.

The intra-views with Marianne in her home before and after the period of observation lasted about one hour each time. In the first intra-view, I asked her open questions about her education and teaching experience, and how she normally teaches the violin. She had received these questions prior to our intra-view. I also told her a bit about my own experiences as a teacher,

and we discussed how it is different to teach in different local communities. The second time we met, I brought some stories from the lessons, and we discussed them. During the discussion, Marianne directed my attention toward aspects I had not noticed. We took turns leading the direction of the conversations. Mostly, Marianne lead, but when she asked me for questions or topics to discuss, I consulted the stories or the interview guide.

Reading agential realism turned my attention from humans and their words toward matter and doings. Thus, what I still thought of as interviews (I encountered the term intra-views later) had lost their privileged position when I approached Astrid to make arrangements for interviewing and observing. When tight schedules on both my and Astrid's part made it difficult to find a time for an interview, I did not insist on doing them. I would have made a greater effort to conduct intra-views, not interviews, had I been thinking with agential realism in the way I do now and had I already encountered the practice of doing intra-views. Inspired by walking intra-views (Zarabadi, 2021), I imagine that to do intra-views while being engaged with the materials of violin teaching, like sorting sheet music or going through the stored violins, would have been very generative.

Some weeks after the pandemic hit us in March 2020 and Norway went into lockdown, I participated in a meeting for string teachers. Listening to teachers share their experiences with online teaching, I thought it would be interesting to intra-view the teachers of my study about their experiences. Based on this meeting, my own experience teaching online, and discussions with my supervisors, I wrote a list of topics (see Appendix 4) related to online teaching. I conducted individual intra-views with Marianne, Astrid, and Linda over Zoom, each of them lasting about one hour. While talking, I kept the list beside me and ticked off the topics as the teachers addressed them, and whenever they asked for a question, I posed one related to a topic not yet discussed.

Audio Recordings of Intra-Views

The intra-views, including the online intra-views, were recorded by a handheld recording device. The recordings were stored locally on my work computer and protected by a password in accordance with the legislation on how to treat personal data. The sound quality was good with little background noise making it easy to listen to the spoken words.

As my thinking shifted from taking boundaries, including temporal boundaries, as something fixed and unmovable toward thinking of them as moving and becoming, the way I used the audio recorder shifted. While doing the first two intra-views with Marianne, I turned the recorder on after we had sat down at the table, exchanged some polite greetings, and poured our coffees. While doing the intra-views online one year later, I turned on the audio recorder

as I got ready. Thus, these recordings include the porous beginnings and endings of the intra-views, including sounds of me finding the charger and fretting over not getting Zoom to work or of my tired sigh after saying goodbye.

Transcripts of Intra-Views

Thinking with agential realism recognizes that transcripts "are contested texts that constitute, not represent, realities and meanings" (Nordstrom, 2015, p. 395). Thus, transcripts, like audio recordings, are part of the research apparatus rather than representations of reality that are more or less accurate and nuanced.

The transcripts were made using iTunes and Sony WH-1000XM3 headphones to play the recordings and Word to write in. The rather clumsy technology gave me some resistance, and I might have spent less time on the task if I had used a more professional setup. The monotony of the task of transcribing was tiring. I had to portion it out during the day to take frequent breaks to keep me awake. I wrote down the spoken words, sometimes adding notes, based on memory and the notes made during the intra-view, related to body language when the teachers demonstrated a movement. I gave the teachers pseudonyms in the transcripts and wrote phrases like [well-known professor] or [conservatoire in large European city] to avoid including information that could identify them. To ease the connection between the recording and the transcripts, I added time stamps.

At the beginning of the inquiry, I thought of the transcripts as important data in and of themselves. As data began to lose its stable and privileged status and started becoming materialized engagements, the transcripts took on a different role. Rather than being the object of investigation, they became part of the phenomena, and I often used the transcripts as maps to navigate the audio-recordings of the intra-actions, moving back and forth between transcripts, recordings, and drafts of stories. I return to transcripts and their doings in the following section on observing lessons.

Observations

As with interviews becoming intra-views, my conceptualization of observation has changed during the process of doing inquiry. Barad (2007) insists on taking phenomena as the primary ontological units and on the entangled nature of the object measured and the measuring apparatus. Thus, to observe is not to stand outside of that which is observed but to take part in its becoming.

As I wrote when discussing the spatial entanglements, Marianne and Astrid held their lessons in elementary school classrooms. When entering these rooms, I tried to position myself at a table (to make it easier to take notes) and toward the back of the room. The teachers often arranged the furniture to make a dedicated space within the room where the lessons were held, and I found myself a seat at some distance from that space. My main impression was that the students paid me little attention during the lessons. But based on my own experience with students when there are unknown adults present, I assume they were a little more well-behaved than they might otherwise have been. There were some events where the students talked to me or acknowledged my presence. While doing online observations, I greeted the student and teacher at the beginning of the lesson before turning off my camera and muting my microphone. During these lessons, the students did not address me at all. Linda, the teacher teaching the online lessons, sometimes asked me a question or made a comment directed at me. I assume that the teachers and the students overall were well aware of my presence, but I also assume that they, by consenting to have me at the lessons, felt quite comfortable being observed.

Field Notes From Observations

During my observations of orchestra rehearsals, group lessons, quartet rehearsals, concerts, and violin lessons, I wrote field notes. In these notes, I tried to anticipate what I would have trouble remembering, and, in the situations where I recorded the sound, what would help me when listening to the recording later. As soon as possible after the observation, I typed the handwritten notes into Word, adding whatever I could remember. These field notes were helpful as they, in many ways, were the first drafts of the stories. However, as I engaged with the materialized observations, the audio recordings took the role as the preferred media.

Audio Recordings of Observations

In qualitative research, audio recording devices are assumed to capture a version of reality that, although flawed and reduced compared to the event it captures, is possible for the researcher to study. The discourse of a recording device as natural and needed, and as a way of capturing reality, has survived shifting research paradigms for forty years (Nordstrom, 2015). Shaped by these qualitative assumptions, I initially took for granted the doings of the audio recorders I used to record the lessons and intra-views. When considering what the presence of a recording device did, I considered how to ensure the recorder would function by bringing extra batteries and to what extent it would alter the words and intentions of the "informants."

Inspired by other scholars' works on the materiality of doing inquiry (e.g., Kind, 2013; Nordstrom, 2015; Osgood & Giugni, 2015) and by my supervisors, I began questioning the doings of the audio recorder. But it was not until the COVID-19 virus forced violin lessons online that the agentic nature of sound recordings really started working in this inquiry. The

agency of technology became more prominent when I started observing the online lessons. The lessons were held on FaceTime and Skype. On both platforms, and using several different Wi-Fi networks, the picture and the sound would lag, stutter, and glitch,[96] and the sound and the video would quite often be out of sync. The sound of the lessons was recorded by my recorder, which was placed beside my computer and captured the sound from my computer speakers and the sound of me taking notes on another computer by its side. The result was a sound far away from the presumably quite beautiful sound I would have heard if I had been in the same room as the students playing.

The stutter and lagging of Zoom and Skype made me question the reliability not only of the audio recordings but also of the idea that sound is shared. If spacetimematter is intra-actively becoming, why cannot sound do the same? Following this line of thought, I also began to wonder which sounds were being registered by the audio recorder and which sounds were not, and how the sounds were being transformed by being recorded and then played back through speakers or headphones. When listening to the audio recordings, I quite often found that my perception of the sounds expanded by repeatedly listening to them, and that my initial impression of what was going on could be multiplied by other ways of hearing and thinking.

While observing my participants, I used two different recorders. One had a better sound quality than the other. This influenced what I was able to hear in terms of the nuances of the recorded sound and also in terms of my patience and willingness to listen. The poorer sound quality was a lot less enjoyable to listen to, making it harder to dedicate time to listening when transcribing and writing diffractive stories. Because of their limited recording range and variable sound quality, the recording devices and the equipment used to play the recordings took part in tuning the apparatus of inquiry.

Transcripts From Observations

I gave the teachers and the students pseudonyms in the transcripts of observations like I did in the transcripts of the intra-views. I also omitted names of people and places and any other information that could potentially identify them. I mostly excluded pauses and sounds like *mm* and *ehm* in the transcripts but added notes about them when they were particularly prominent. The audio recordings of the lessons often contained several layers of talking and playing, and I had to repeatedly listen to them to figure out the words. From the period of observation with Marianne, I merged transcripts and fieldnotes into one document and added

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96   Niccolini (2016) uses glitch-art to create distortions in the research data. Although the glitches in my inquiry were initiated by Zoom, FaceTime, and Skype and not by the researcher, they worked in ways similar to Niccolini's glitch methodologies in disrupting everyday objects and experiences.

notes on the music played. This was part of experimenting with how to work the materialized entanglements into stories. I tell of this process later in the chapter.

Engaging with the recordings through transcribing and reading the transcriptions created ways to play with the data. The transcripts did not replace the audio recordings. They functioned as a "limited, inherently political, and yet highly useful map for navigating the data terrain" (Ellingson & Sotirin, 2020, p. 56) as they made me familiar with the recordings, and I could scan the text quickly in order to find the events I wanted to explore in greater detail. Mostly, I turned to the recordings—supported by the field notes—when writing stories to be mindful of the singing and playing done and to be able to notice the intonation, timing, rhythm, articulation, and timbre of the music.

Google Keep and Journal Entries

During the lockdown many aspects of my life moved to digital platforms, and this changed the way I used technology. I could have kept a multimodal digital research diary before the pandemic; in fact, I had been urged by my supervisor Professor Jayne Osgood to do so. But I had not yet done it. In the first days of the pandemic, I started making entries in Google Keep, including snippets and pieces of images, texts, sounds, and drawings related to the inquiry and my life in general. These multimodal diary entries, combined with the written research diary I already kept and the practice diary I would later keep, became a part of the research apparatus. Many of the entries were spurred by readings of books and research articles, but some of them are expressions of frustration and bemusement by the many interruptions made by family, COVID-19, and my own lack of concentration and self-control.

The notes became an uncensored arena for expressing myself outside of the boundaries of academic writing and without thinking about an audience. The process of creating and later revisiting them has generated thoughts that have become a part of the dissertation, and parts of the journal entries have been reworked into stories. Rereading the notes has functioned as a conversation between different versions of myself and made tangible how thinking moves in a topology of connections and entanglements rather than in linear ways.

Sheet Music and Practice Plans

In the lessons, much of the attention of the students and teachers was directed toward sheet music. Sometimes the sheet music was physically present, and, at other times, the sheet music was missing or impossible to find in stuffed ring binders. Thus, I asked the teachers to provide me with the sheet music. The sheet music from the lessons existed in varying forms, ranging

from copies with hardly any notes to the Bériot violin concerto containing generations of notes from teachers to students. I have engaged with the sheet music and practice plans by reading them, taking notes on the layers of annotations, and by playing them.

Exploring Entanglements

As the chapter so far has made tangible, this inquiry holds many parts that take different forms. Similarly diverse approaches to doing inquiry have called this practice bricolage (Odegard, 2021), bag lady storytelling (Osgood & Giugni, 2015; Taylor et al., 2013), or tentacular storytelling (Osgood & Mohandas, 2021). As I wrote in the previous chapter, the feminist new materialist and posthumanist critique of representation, of which Barad is an explicit advocate, troubles the notion of data and data analysis. In an agential realist account, data does not have an independent existence outside of the phenomena, nor does the researcher analyze data from the outside. Data is no longer raw material for our interpretation and explanation that aims to identify what is really going on or uncover significant meaning beneath the surface messiness of talk or action (MacLure, 2017).

Rather we, as researchers, must "acknowledge that data have their ways of making themselves intelligible to us" (MacLure, 2013a, p. 660) and make ourselves, as parts of the universe, intelligible to other parts (Barad, 2007). One task for the researcher then becomes being attentive to the invitations issued by data. These invitations could take the form of data glow (MacLure, 2010, 2013a) or wonder (MacLure, 2013b), or as sticky stories (Moxnes & Osgood, 2018). In the following section, I explore how the research apparatus was tuned to the particularities of the entanglements at hand (Barad, 2007) and how I engaged with the materialized entanglements of "data" in creating diffractive stories and doing diffractive readings of stories and theories.

Excluding and Including

As the overview of the materialized entanglements showed, the lessons and intra-views amounted to large amounts of text and audio recordings, as did the diary and Google Keep entries, sheet music, and practice plans. To work with this material in writing a dissertation, I had to decide what to include and what to exclude when writing stories and to what extent I should engage with the different parts. This process of excluding and including material took place throughout the inquiry, and I changed my mind numerous times in the process to "responsibly explore entanglements and the differences they make" (Barad, 2007, p. 74).

One example of this was told in the beginning of the chapter when I decided not to video record the lessons based on the trial observation and the questions from Sarah's dad. In revisiting this example, I also want it to be a reminder of how I—the differentially constituted researcher writing this chapter—take part in my own becoming. When I first discussed the decision to not do video recordings, I omitted an important part of the story due to embarrassment. While I was still in the process of making a decision, I did contemplate using multiple cameras to film the students and teachers from various angles. But I did not have the technical competency (or the drive to gain it) to know how to do this, and, thus, I discarded the idea. This less flattering lack of skills on my part was also part of the decision to exclude video recordings.

But although video recordings would have added another aspect to the inquiry, I soon found that the observations and audio recordings gave me more than enough to work with. When first planning the inquiry, I imagined that three teachers, along with two or three students or groups of students, would be a small engagement with the field. As I gained experience in working with the materializes entanglements, I realized that it was way too much material for one dissertation. In the following section, I give an account of how I chose which lessons to write stories from. I first relate to some practical and ethical concerns before moving on to the affects I experienced when grappling with the considerations to include or exclude material.

Including and Excluding Lessons

As the overview of the lessons with Marianne and her students showed, I observed one group of students and two pairs of students. The group lessons included between five and seven 11-year-old students. I only took notes and did not use audio recordings because I decided the amount of work needed to obtain the required informed consent exceeded the potential use for audio recordings. When taking notes, I omitted all personal information. Sarah and Olivia (both aged 8) attended all four lessons that I observed, while the other two students (aged 9 and 10) did not. After grappling with the materialized entanglements for a while, I decided to write stories from only the lessons held with Sarah and Olivia. Their consistent attendance at the lessons made it possible to explore how the lessons were temporally entangled, which I deemed to be of interest.

I made similar deliberations when engaging with the materializations from the lessons with Astrid. The chamber orchestra was too big for me to obtain informed consent within the time I had available. I also considered the form of the rehearsal—the orchestra was playing a piece they knew quite well and getting ready for the concerts, so most of the rehearsal was dedicated to playing longer sections of it while working on keeping the tempo—to be of less interest. Of the students taking lessons, only Nora regularly attended lessons, and I, therefore, chose to write stories from her lessons. I sent information about the inquiry to the parents of

all quartet members via e-mail and handed the paper versions to the students, but I did not receive their answers before the concert. Thus, I did not record any of the quartet rehearsals. I found the field notes worked well as the basis of stories from the rehearsals.

Linda was very deliberate in deciding which students she wanted me to observe lessons with. She identified two students she felt were in a position to cope with an observing researcher—a potentially challenging element—in an already-challenging situation. During the period of observation, it became clear that one of the students wanted to switch to another teacher for the following year. This made the situation between the teacher and student a bit complicated. Although this could have inspired highly interesting stories, I judged the potential harm of writing stories based on these lessons too high compared to the potential benefits. Besides, both of the students' lessons held the potential for interesting explorations of spacetimemattering, Thus, I only wrote stories from lessons with Freya.

All lessons included in the dissertation held the potential for more stories than the ones I tell. In the following section, I engage with how parts of the transcripts and audio recordings became stories and with how the stories have moved and multiplied.

From Sorting to Wondering

To follow St. Pierre's call for letting the reading of philosophy, not methodologies, guide the doing of inquiry (St. Pierre, 2019a) requires some courage. At least it did for me. When I first started to work the transcripts and audio recordings from lessons into stories, I still held onto the ideal of being a "good" qualitative researcher. Although I quicky left the idea of coding behind, I still thought the process of engaging with the lessons should be defined beforehand, preferably by separate stages. Thus, I first merged the transcripts and the fieldnotes from each of the lessons with notes on the music played and put them into a table. Then, I devised a system that I could use to keep track of the exact sections of the recordings, the emergent themes, and the way the stories developed as I returned to them. This produced 42 pages of notes and stories, all neatly organized. But still, I felt lost when trying to write the stories. Building on Barad's philosophy, Murris writes that "getting lost is part of the joy and frustration of a philosophical education" (Murris, 2022, p. 16). At this stage, the getting lost felt not so much joyful as it felt frustrating and hard.

By the time I started engaging with the materializations from the lessons with Astrid, I had read more literature on doing postqualitative inquiry. I had encountered the writings of MacLure on glimmering data (MacLure, 2010) and on the wonder of data (MacLure, 2013b). MacLure suggests that wonder is needed as a counterpart to "the exercise of reason through

interpretation, classification, and representation" (p. 228). There is capacity for wonder in the entangled relation of data-and-researcher. To wonder is a liminal condition, an experience between that of knowing and unknowing, which affords an opening into the new. Wonder is also, MacLure writes, material. It might be felt in the gut or in a quickening heartbeat. For me, it was often felt in the movement of fingers and arms as I wondered with my violinist body and its imprinted movements. And wonder is relational; it is intra-acting; it is affectively moving across human and nonhuman bodies as well as traversing virtual and actual, animate and inanimate. Neither data nor researcher pre-exist the other.

Inspired by MacLure and others (e.g., Moxnes & Osgood, 2018; Osgood & Giugni, 2015), I abandoned the tables and systems I had devised and, instead, dived into the material-ized engagements with a more open and intuitive approach. It is telling that the documents I wrote in during the engagement with Astrid's and Linda's lessons are named "Questions and thoughts with [name of teacher]." Rather than finding what was "in" the lessons and trying to place the topics into tidy categories, I started wondering and asking questions. In doing so, I found a new joy.

Ellingson and Sotirin (2020) propose *joy* as an ethos of data engagement in which "joy is an affirmation of the vitalities of life itself encountered in the becomings of data engagement" (p. 13). Furthermore, they argue that data engagements create thresholds where new thoughts and novel actions might take place, evoking joy but also despair and feelings of chaos. These feelings of joy, sense, and glimmer gained prominence as I abandoned sorting and started wondering. This joyful process produced 20 pages of notes from the lessons with Astrid and 65 pages of notes from the lessons with Linda. The difference in amounts is due to how the online lessons with Linda transformed my conceptions of the boundaries of violin lessons and created a joyful cascade of questions.

But although the feelings of joy or glimmer were a part of the process of writing the stories, they were not a reliable part. Sometimes, what had not glimmered before started to glimmer. I expected this might happen, so I made a point of not deleting my writings and kept the discarded bits of potential stories in documents that I later revisited. Some of the bits of data glimmering the strongest were found in a document titled "Cuttings From Stories, Most Likely Unimportant." Although I have done my best to not overlook glimmering parts of the mate-rial, I expect there may be many ignored glints that could have become stories but did not.

Writing Stories

In writing the stories, I have let go, yet again, of the idea that there is something "in" the materialized entanglements to find and to present. Rather, I have used the stories as my way of "responsibly explore entanglements and the differences they make" (Barad, 2007, p. 74). In the following section, I explore how I have related the writing of the stories to the reworked notions of objectivity and validity.

Objectivity Reworked

In writing stories—as opposed to more traditional transcripts of narratives that seek to objectively represent the reality—I have tried to explore the bodily and affective aspects of violin playing. MacLure (2013a) suggests that researchers working within a materialist research practice should rework the status of language as given by constructionist or discourse theories. She writes that "a materially engaged language would … be non-representational, non-interpretive, a-signifying, a-subjective, paradoxical and embroiled with matter" (p. 663). Furthermore, she suggests that "data" (in my understanding, materialized entanglements) should be read as sense-events and in ways that more fully engage with the materiality of language—of its entanglements with bodies speaking and writing as well as bodies affected—rather than lopsidedly focusing on the immaterial and discursive aspects of language. I have brought MacLure's suggestions into my engagement with the materialized entanglements and let it inspire me to pay attention to the affects and bodily sensations of the lessons. Through writing the stories, I have aimed to create some of these affects anew. One example of this is the story in which Freya meets a spider, and I later meet another spider. I hope that the story elicits a bit of tingling fear in the reader and works in affective ways.

Another way I have explored the entanglements of the inquiry through writing stories is through multiple stories. The stories, like the materialized entanglements, do not sit still. They are shaped by the traditions and discourses of what a story is and could be, as well as those governing doctoral dissertations; they are shaped by the material agencies of computers, printers, keyboards, and paper; they are shaped by the theories I think with; and they are shaped by the reader reading the stories. All of these entanglements might work in different ways to create different stories. In each of the events that became stories, I made choices about what to include and what to exclude, which entanglements to explore and which to leave unexplored. Some of the stories became one story relating to one event. Others, for example the story of Sarah playing a scale after she lost the stickers of her violin's fingerboard, became multiple stories. By re-turning to the event and exploring what else can be told, I tell different stories based on the event. One story explores the material agency of the stickers and another the entanglements and boundaries of Sarah, Olivia, and Marianne. A third story explore the way

the student's and the teacher's bodies are entangled when adjusting the pitch of the scale. The different stories are differentially becoming through tuning the apparatus differently.

Validity Reworked

To write multiple stories challenges the representationalist notion of validity, of stories as "true" representations of what happened. In an agential realist account, questions relating to validity move from questions of the accuracy of representation to questions of being response-able for the part we play in the world's materialization. In all parts of the dissertation, I endeavor to be able to respond to my part in the world's becoming. When writing the stories, I have tried to be mindful of how I relate the stories to the recordings and field notes and be mindful of my choice of words. I have also been mindful of the workings of language. I consider the act of translation an act of reworking and retelling by which meaning is not transported from one language to another but is becoming in new intra-actions.

Although I have no illusions about the truthfulness of the stories, part of being response-able involves knowing how others will respond to them. Thus, I sent the stories to the teachers involved in the lessons and asked if they would like to read them and provide comments. Two of them read the stories and told me that they enjoyed reading them. They liked reading another's perspective on the events while also recognizing their experiences of them. One teacher initially commented on the level of anonymity and, after I had suggested changes, decided that it would be fine as it was. The third teacher did not respond. By letting the teachers read the stories and giving them the opportunity to make changes, I added another aspect of response-ability by creating a situation where I would, quite literally, have to respond to them if they wanted the stories to be changed. I did not send the stories to the students involved[97] because they most likely would not have had the knowledge of English to be able to read the stories.

Based on the reworked notions of objectivity and validity, the stories could be said to be both valid and true, and they offer answers to the question of how violin lessons are enacted. Introducing this inquiry, I also stated that I wanted to explore what violin lessons produce. To do so, I turn to diffractive readings.

Diffractive Readings

Diffractive readings are attentive to the differences that emerge when texts—or other media— are read through one another; reading in this way can disturb assumptions about what is

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[97] As discussed in the opening chapter as well as by Hohti and Truman (2021), the use of English as lingua franca in academia matters.

already known. No part of this inquiry is unaffected by theory, and in the diffractive readings I have mindfully selected concepts from the theories I engage with—agential realism, affect theory, intersectional feminism, and Sámi onto-epistemologies—and read stories through those. By doing so, the stories take on yet another form as new patterns emerge. This is not a practice aimed at creating neat categories of similar topics. Rather, diffractive readings are apt for exploring differences that matter, and, thus, they are suitable for doing research in a way that "responsibly explores entanglements and the differences they make" (Barad, 2007, p. 74).

The diffractive readings of the stories and the writing of the stories have been done in entanglement. While writing the stories, I have written comments and questions that have later been developed to become diffractive readings. I have also, when reading theory, been reminded of stories and made notes about them.

The Differences Made

Barad (2007) writes that "the specificity of entanglements is everything", and that we must "responsibly explore entanglements and the differences they make" (p. 74). Haraway articulates a similar point by stating that "the point is to get at how words are made and unmade, in order to participate in the processes, in order to foster some forms of life and not others" (Haraway, 1994, p. 62). In this chapter, I have tried to get at how this inquiry is made through exploring the particularities of the entanglements at hand and how I have tuned the apparatus to them. What difference might such an approach to doing inquiry make? I started exploring answers to this question in Chapter 2 where I suggested three possible moves for posthuman music education research. In the chapters that follow, where I tell stories and read them diffractively through theory, these moves are done. In the last chapter, I explore the differences they might make.

Interlude I: From Answers to Concepts

As a way of introducing this dissertation, I told the story of how my teacher finally approved of my sixteenth notes after I bought a better bow. I also discussed how the philosophies I was introduced to as a PhD student did not, at least for me, engage with the entangled material, discursive, and affective aspects of violin playing. The dissonance I experienced between the epistemology and ontology presented to me as a novice PhD student and the onto-epistemological practices I was familiar with as a former violin student and a present violin teacher led to the question: *How are violin lessons enacted and what do they produce?* So far, this question has been threaded through the chapters of the dissertation. My initial plan was that the following chapters would provide answers to it.

They do not.

Rather than producing answers, the readings of stories through theories generated concepts. Answers are, at least temporary, fixed responses to a question or a problem whereas concepts are apparatuses. Apparatuses create agential cuts, but not as absolute separations. Rather, they are boundary-making practices (Barad, 2007). Thus, the concepts I propose make boundaries; they enact agential cuts useful for generating insight into the phenomena of violin lessons, but they do not generate fixed answers.

The diffractive readings of stories from violin lessons through agential realism, Sámi studies, intersectional feminism, and affect theory created four concepts. Through the diffractive storytelling and reading in "Chapter 6: COVID-19 Troubling the Space and Time of Violin Lessons" and "Chapter 7: The Topology of Violin Lessons," the first concept emerged: *topological togetherness*. This concept generates insight into how time and space, rather than primarily being pre-existing containers (a geometrical notion), are becoming through intra-actions that create ever-shifting connectivities and relations (a topological notion). When we—students and spiders, violins and viruses—are together, we take part in the becoming of the phenomena of violin lessons, including their temporal and spatial boundaries.

The second concept emerged through the diffractive storytelling and reading in "Chapter 8: The Guarneri 'del Gesù' 1742 'Alard' Violin by Jacob von der Lippe" and "Chapter 9: The Violins of Violin Lessons." Through engaging with the strings of my violin, both in a concrete and in a metaphorical way, I explore how violins are connected to the Anthropocene and to gendered power structures. By paying attention to the violins of the lessons, to what they do and how they take part in the enactment of lessons, I explore the agency of violins. Through these explorations, the concept of *tentacular and agentic violins* emerged. This concept is

useful for generating insight into how agency and intentionality are distributed and contested among the humans and nonhumans involved in violin lessons and, thus, into how violin lessons are enacted.

The third concept emerged through the stories told and read in "Chapter 10: Becoming Violinists" and "Chapter 11: Becoming in the Intersections of Race, Gender, and Class." In these chapters, I turn our attention to the becoming of violinists and how the possibilities and impossibilities for becoming are produced through intra-actions. Building on the discussions on the porous boundaries of violin lessons from Chapters 6 and 7 and on the agentic and tentacular nature of violins from Chapters 8 and 9, I argue that the intra-actions producing possibilities and impossibilities for becoming violinists include racial, gendered, and classed materialdiscursive structures. Through these two chapters, the concept of *differential becomings* emerged. This concept holds the potential to generate response-ability not only for who gets access to music education but also for what im/possibilities are offered to certain students once the education is accessed.

When read diffractively through stories from violin lessons, the three concepts of topological togetherness, agentic and tentacular violins, and differential becomings generate insights into the multitude of enactments and productions of violin lessons. In that sense, the concepts— although not taking the form I anticipated—are answering the question I initially asked. When anticipating what the diffractive stories and readings might produce, I also imagined that the answers would form something that resembled categories; not fixed categories, but groups or assemblages of answers sharing similarities.

They did not.

What did emerge was the fourth concept: *knots of knowing-in-playing*. Knots of knowing-in-playing do not start from a category such as intonation or phrasing. They start from the specific entanglements; from the entanglements of violins, stickers, spiders, or the student's body being shaped. Thinking of knots rather than categories allows for explorations of strings and entanglements, and for thinking with the feminist notion of difference as "not opposed to sameness, nor synonymous with separateness" (Trinh, 1991/1997, p. 416). The knots are different from as well as parts of the same phenomena. The knots are different as well as connected. Their relationship is one of dis/continuity (Barad, 2010).

As with the other three concepts, knots of knowing-in-playing are not endpoints in an argument. Rather, it is a concept useful as a tool for conceptualizing the entanglements of knowing and being as argued by Barad in their onto-epistemology. It is also a concept that takes into

account the specificity of the entanglements at hand. Thus, to read violin lessons diffractively through the concept of knots of knowing-in-playing generates insight into the specific entanglement of knowing and being that is enacted in violin lessons. In the following chapters, I aim to trace the many strings and entanglements of the phenomena of violin lessons.

Chapter 6: COVID-19 Troubling the Space and Time of Violin Lessons

I set out on this journey of diffractive storytelling and reading wondering how violin lessons are enacted, and I expected to find answers that said they were enacted in classrooms within the times set by a timetable. Considering my experience as a violin student and as a violin teacher, it seems quite strange that I had those expectations. But still, I did until the COVID-19 pandemic changed just about everything. In this chapter, I explore the troubles caused by the COVID-19 virus and how they forced me to conceptualize the spatial and temporal boundaries of violin lessons as becoming through intra-actions.

When I first started having violin lessons, they were held in my teacher's living room while the smells from his kitchen slowly floated in. The lesson ended when dinner was ready. Later, when he became a SMPA teacher and I became a SMPA student, I used to arrive early to listen to him practice by standing outside the classroom door. Now, I teach students whether they come later or early, with violins or without them. If they don't come, I go out looking for them. Most of the time, after I locate the student, I leave the door open while we have the lesson. Sometimes friends, parents, or siblings enter to play with us on their instruments, to play with Lego, or to sit there listening and commenting.

So why did I start out this inquiry thinking that the spatial and temporal boundaries of violin lessons were fixed? Part of the reason for me doing so might be that Western epistemologies rely on an understanding of space as a container or context; of time as linear, predictable, and progressing; and of matter as pre-existing *in* space and time (Barad, 2007). As I started reading the work of Barad and other feminist new materialist and posthuman scholars, I was introduced to contesting concepts of space and time. It would be nice to say that this completely changed how I thought of the temporal and spatial boundaries of violin lessons. But that would be a lie. To read Barad's writing moved my understanding of space and time so that I, when I observed Marianne's lessons, started the recorder before the student entered the room and stopped it after the playing part of the lesson ended. But the topological notion of space and time—a notion that takes into account the shifting manifolds and connectivities of space and time—did not really sink in.

Admitting so is a bit shameful. It feels like a personal shortcoming in my ability to process complex theories. But in the complex theories of Barad, there is also comfort for a researcher-in-training like me. According to Barad, the possibilities and impossibilities of thinking and doing are not purely cognitive or discursive, nor are they located in the individual human. Rather, "*theorizing, like experimenting, is a material practice*" (Barad, 2007, p. 55, emphasis

in original). The material practices, or rather the materialdiscursive practices, we are part of are also a part of the theorization we do. Thus, my inability to think of the spatial and temporal boundaries of violin lessons through Barad's notion of space, time, and matter as "an iterative becoming of spacetimemattering" (p. 234) was produced through the intra-actions of me *and* the materialdiscursive practices I was part of. As those changed, the possibilities for theorizing changed.

In March 2020, the COVID-19 pandemic and the measures taken to prevent the spread of the virus affected me and so many others. I started to teach online, to observe lessons online, and to do intra-views online. The virus changed how space, time, and matter worked; it changed the materialdiscursive practices I was a part of. These changes troubled the assumptions I had of space, time, and matter that, until then, had been unnoticed by me. The space of violin lessons stopped being a classroom or a home and became online meeting rooms *and* my home *and* the homes of others. The time we spent in that space stopped being "a succession of evenly spaced intervals available as a referent for all bodies" (Barad, 2007, p. 234) and became a monstrous and unpredictable mess of lagging, stuttering, and questions like "can you hear me now?" And the materializations happening in these troubled entanglements of time and space were not shared among teachers and students. We could not touch. The sound I heard was not the same sound as the others heard. We were not together in the way that had previously been taken for granted.

This dissertation builds on the agential realist tenet that the primary ontological unit is phenomena—"the *ontological* inseparability of agentially intra-acting components" (Barad, 2007, p. 333, emphasis in original)—and that specific intra-actions enact agential cuts creating the condition of exteriority-within-phenomena. Thus, boundaries are not fixed or pre-existing; boundaries are produced and iteratively reconfigured through materialdiscursive boundary-making practices.

At first glance, the troubling of time, space, and togetherness might seem like a philosophical mind trick with no practical relevance for face-to-face lessons. But, as Haraway reminds us, "it matters what matters we use to think other matters with" (Haraway, 2016, p. 12). By thinking of the boundaries of violin lessons trough agential realism, a slightly different world comes into being. The exploration of the boundary-making practices of online lessons in this chapter creates the possibilities of reworking the spatial and temporal boundaries of face-to-face lessons in the following chapter, and for developing the concept of troubled togetherness. Together with the insights offered in Chapters 8 and 9, this work is crucial for developing a more response-able music education that takes into account the differential im/possibilities for becoming that are offered to students.

I start this chapter by telling the story of how Linda and I struggled to find out how I could observe the online lessons, and the story of a spider entering the lessons. By reading these stories through the agential realist concept of spacetimematter, my assumptions of space as a fixed container are troubled. In the second part of the chapter, I tell a story of a metronome and of how the online lesson transformed its previously regular click – click – click to a monstrous mess of clickclick – – – – click. I also tell a story of how a metronome, in another situation, gave me comfort when practicing. Through reading these stories, I explore how the temporal boundaries of violin lessons were troubled by the COVID-19 virus. I end this chapter by grappling with the affects of tiredness and despair that were working in the online lessons. I read stories from the lessons diffractively through the Sámi concepts of *oktavuohta* (Jensen, 2020) and *Siida*[98] (Kramvig & Flemmen, 2019) and through Le Guin's (1986/2019) carrier bag theory of fiction. This reading generates insight into how the idea of being together in the lessons was troubled by the changes of the space and time of violin lessons.

Troubled Space

Haraway (2016) urges us to stay with the trouble and Pratchett, through the character Sam Vimes, reminds us that we are in trouble anyway. "It's just a case of deciding what kind we want" (Pratchett, 2002, p. 221). But sometimes, trouble is just trouble; staying with it or deciding what kind of it we want seems meaningless and cruel.

On March 11, 2020, the World Health Organization declared a pandemic caused by the COVID-19 virus. Two days later, the Norwegian government announced measures to prevent the transmission of the virus, and Norwegian society went into full lockdown (NOU, 2022). Two and a half years later, more than 630 million cases and 6,6 million deaths have been reported, making COVID-19 one of the deadliest pandemics in history (World Health Organization, 2022).

The pandemic triggered social and economic disruption around the world in countless ways. It affected all aspects of life for me; for other humans; for animals; for the climate; for all living and nonliving things; and for those entities that cannot be defined by the living–nonliving binary, such as the virus. It caused tremendous amounts of suffering. The doings of the COVID-19 virus were, and continue to be, enormous. To engage with them all is beyond the

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98   I follow the practice by Kramvig and Flemmen (2019) of capitalizing the term.

scope of this dissertation[99] and to say that we must stay with the trouble caused by the virus has, at times, felt like a mockery.

But still, what else can we do? When trouble comes, there is no way to engage with it other than to stay with it and to explore the intra-actions and entanglements it brings as we try to "foster some forms of life and not others" (Haraway, 1994, p. 62). What is untroubled, goes unnoticed. But by troubling my unnoticed assumptions of time and space, the virus created other possibilities for storytelling and theorizing that could foster other forms of life. These other forms of life might hold the potential for a more response-able music education where space and time are seen not only as prerequisites for lessons, but also as agencies taking part in the enactment of lessons. In Chapters 10 and 11, I return to this when exploring the differential becomings of violinists in intra-actions with space, time, and matter and in the intersections of race, gender, and class. But for now, I start with a story, told in three parts, of how Linda and I struggled to figure out where to meet. Then, I tell a story of how the lesson we were having together also included a spider, and of how the spider was and was not together with all of us.

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Where Do We Meet? Part 1

Because Norway went into lockdown the same week for which I had planned the first intra-view with Linda, we canceled the intra-view and the observations planned for the following weeks. When I contacted Linda some weeks later and asked her if I could observe the lessons online, she declined. But she was happy to meet for an intra-view on Zoom.

Where are we when meeting on Zoom?

I met Linda on Zoom. I scheduled a meeting in the app and sent Linda an invite link to my Zoom meeting room. She arrived in the waiting room, and I let her in. Then, we met while being interrupted by various instances of lagging sound and frozen images. We met on Zoom.

Where are we when meeting on Zoom?

I met Linda in the combined office and storage room next to the music room at the school where I teach. When I started working there, I spent days sorting through Orff-xylophones and their loose staves, drums with broken skins, a variety of percussive instruments, and recorders in all sizes, piled up in heaps. Many of them were marked with another school's name, and I guess they were gifted to us when that school upgraded their instruments. Later, the string orchestra practicing at the school was gifted the used violins from a community music project that had to close down due to lack of funding. Thus, the walls of the combined

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99   The virus and its doings have been engaged with from a feminist new materialist and posthumanist perspective by several scholars (e.g., Geerts, 2021; Murris, 2022; Osgood et al., 2022; Sikka, 2021).

office and storage room where I met Linda were covered with cupboards filled with assorted instruments, including violins, violas, and cellos. Balanced on top of the cupboards, taking advantage of the high ceiling, were more instruments. Under the window, where the temperature varies too greatly for instruments to be stored there, I had found place for a discarded table and a chair. We met in an overly full storage room that doubled as an office.

Where are we when meeting on Zoom?

I met Linda at the front porch of her summer cottage. It was a chilly spring evening, and she had brought a blanket and a cup of tea with her. As we were talking, I could see the green garden behind her. When the sun set and the air cooled, the birds started to sing. We met in a peaceful spring garden.

Where are we when meeting on Zoom?

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Through this first meeting with Linda on Zoom, my understanding of space started to move. We met on Zoom and in different locations. If I had considered the space where Linda and I met through the lens of space as a unified, fixed container—thinking geometrically—I might have tried to bring the multiple spaces together. I might have tried to merge the storage room, the summer cottage, and the Zoom meeting room in an attempt to find the overlapping points in space where we met. But because I started thinking through the agential realist notion of spacetimematter as becoming and topological, it became possible to conceptualize the space where we met as becoming and as multiple. Space also became differential as the specific intra-actions producing the spatial boundaries were not the same for me, sitting in the overflowing storage room, as they were for Linda, who was sitting in her peaceful garden. Barad puts it like this:

> In my agential realist account what is at issue is not merely that time and space are not absolute but relative (following Einstein); rather it is that intra-actions themselves matter to the making/marking of space and time. In other words, spatiality and temporality must also be accounted for in terms of the dynamics of intra-activity. (Barad, 2007, p. 180)

Thus, the spaces where we met were intra-actively becoming and these intra-actions were not the same for Linda as they were for me. Nor are the ways we connect in space restricted to geometrical and fixed distances. Linda and I met on Zoom. We shared a space that, in many aspects, made us close together. But we also did not share the same space; we were far apart. In addition to being in multiple relations—both far apart and close together—we were in shifting relations as the sound and picture were sometimes synchronized and, at other times,

they lagged and froze and stuttered. Space, time, and matter were iteratively (re)configured. And they still are. The space and time of our meeting are becoming through the reading and writing of the story of it.

> Space, time, and matter are mutually constituted through the dynamics of iterative intra-activity. The spacetime manifold is iteratively (re)configured in terms of how material-discursive practices come to matter. The dynamics of enfolding involve the reconfiguring of the connectivity of the spacetimematter manifold itself (a changing topology), rather than mere changes in the shape or size of a bounded domain (geometrical shifts). (Barad, 2007, p. 181)

As I wrote in the introduction of this chapter, reading the thoughts of Barad did not, at first, shift my thinking from my habitual assumptions of time, space, and matter. But in reading the excerpt above after making the changes in my materialdiscursive practices, I read it as an invitation to shift my attention to "the reconfiguring of the connectivity of the spacetimematter manifold itself" (Barad, 2007, p. 181). This shift in attention is a shift from asking where the temporal and spatial boundaries are to asking how and what they are becoming. It is also a shift from expecting the question to generate answers toward expecting it to generate concepts or tracings.

The COVID-19 pandemic and the new ways of engaging with space and time that it brought with it were unexpected and frightening. In a couple of days, the public debate in Norway moved from one tinged with slight worry to one declaring an emergency situation. We were not, in any way, prepared for the sudden lockdown. Reading the passage quoted above adds to the feeling of trouble. I am troubled by the claim that space and time do not have bounded shapes or sizes. I am troubled by the idea that space and time are not stable entities. I am troubled by the concept of a spacetime manifold that is iteratively (re)configured. How can we ever predict how time and space are becoming? Are we doomed to always expect the unexpected? Taking up Donna Haraway's call to stay with the trouble, I read on and find this passage:

> Intra-actions are nonarbitrary nondeterministic causal enactments through which matter-in-the-process-of-becoming is iteratively enfolded into its ongoing differential materialization; such a dynamics is not marked by an exterior parameter called time, nor does it take place in a container called space, but rather iterative intra-actions are the dynamics through which temporality and spatiality are produced and iteratively reconfigured in the materialization of phenomena and the (re)marking of material-discursive boundaries and their constitutive exclusions. (Barad, 2007, p. 234)

The nonarbitrary and nondeterministic nature of intra-actions is important when reading stories and Barad's agential realism through one another. The becoming of space and time is nonarbitrary. It is not possible for any space or any time to become. As I wrote in Chapter 3 on theories and Chapter 4 on methodologies—and, as in music—there are rules governing what might become. But nor are space and time predetermined or pre-existing. They are not there prior to the intra-action and their becoming is not determined; they are produced through the intra-action. The becoming of space and time is done within the possibilities and impossibilities of phenomena—the "*ontological inseparability/entanglement of intra-acting 'agencies'*" (Barad, 2007, p. 139, emphasis in original). Space and time are both becoming as a result of intra-actions, and they are intra-acting agencies. This reworking of causality allows us to pay attention to possibilities and impossibilities as not fixed but as becoming. Thus, it is possible to have expectations of how the future might unfold while not falling into the trap of determinism.

Reading this understanding and the story of meeting Linda through one another allows me to grapple with how our spatial locations are enacted by agential cuts. These cuts are cutting together-apart in one move (Barad, 2014), neither conflating differences nor forcing permanent cuts. Thus, we meet, in different spaces, relying on the feminist conception of difference as "not opposed to sameness, nor synonymous with separateness" (Trinh, 1991/1997, p. 416). This understanding of space allows us to meet and not meet in a topological dis/continuum where "two points that seem far apart geometrically may, given a particular connectivity of the spatial manifold, actually be proximate to one another (Barad, 2007, p. 451, footnote 26).

Although I now, after grappling with this troubled and topological concept of space, can write of it in what I hope is a clear way, it completely baffled me in the spring of 2020. The affects—the fear, confusion, despair, trouble—working across human and nonhuman bodies troubled my ability to think. When Linda suggested that I observe her online lessons, I could not figure out how to do it.

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Where Do We Meet? Part 2

I soon found that I enjoyed talking to Linda about online lessons. We shared some of the same experiences, and it was nice to be able to discuss this strange and unfamiliar way of teaching. Linda told me of her feeling of being exhausted and tired while trying her best to teach her students in a difficult situation, of how she had bought an iPad because her computer could not handle the online platforms, and of the students and their various devices and Wi-Fi access. I shared some of my troubles. I think Linda enjoyed our conversation, too.

"Now that I have talked to you …" Linda stopped and thought for a moment. "I think I would like to contribute to your project by letting you observe my lessons."

"I would love that!"

"But the problem is … you asked to do it on Zoom, and I really don't want to. Do you hear me? I can't hear you." Leaning in, Linda looked puzzled.

"Is this better?" I answered while trying to figure out the problem. "I have turned up the input level now. Can you hear me?" Also leaning in, I noticed my voice getting higher and more strained. "I don't know …"

"That is better." Linda stopped talking when she realized I was not done. I felt an urge to fill the awkward silence but managed to hold back. The last couple of weeks had taught me that talking on Zoom requires a pace different than the one I was used to when talking face-to-face.

"Where was I?" Linda continued. "Oh well, I have one student on Thursdays. We are using FaceTime. And I have another student, but she has no Apple products, so we are not using FaceTime. We tried Zoom once but had some trouble. Now we are using Skype."

"Wait a minute." I eagerly spoke over Linda. "I did a quick Google search. It seems like it's possible to do a screen recording of FaceTime. "But," my voice became unsecure, "there's the issue of security. I don't have the permissions to send videos over the internet. They are classified as sensitive information, and I don't think I have access to secure transfers."

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At this point, my face gets hot every time I read the story. Now, it seems so obvious to me that we could have done a meeting with all of us participating but with me muted and the camera turned off. But at that point, it was not obvious at all. When I first listened to the recording of this part of the conversation, I cringed. I felt embarrassed. I encountered a resistance toward transcribing it and reworking it into a story, or even thinking of it. Both my inability to imagine how to observe online lessons and my resistance toward engaging with this part of the conversation could be termed affective. There were forces working on me—feelings of fear and confusion due to the pandemic, eagerness to find a solution to Linda's satisfaction, a feeling of obligation to fulfill the ethical standards when collecting personal information, embarrassment over my failure to imagine a solution—that affect the intra-actions of the story.

Affects are "the forces (intensities, energies, flows, etc.) that register on/with-in/across bodies to produce and shape personal/emotional experiences" and the event that "forces you to be(come) affected" (Dernikos et al., 2020b, p. 5). In the spring of 2020, when Norway, as well as many other parts of the world, was locked down due to the pandemic, the affects that worked on my body to produce and shape my experiences were unlike any that I had encountered before. And, in between these troubling affects, there was an expectation that things should

continue as normal. Children were still at school. Online school. I was still a PhD student with a project to finish on time. From my home. SMPA teachers were still expected to give lessons to their students that were as good, if not better, than they were before.[100] Online lessons. These affects, the intensities and energies that moved between my body and other human and nonhuman bodies, affected my ability to think and to imagine what I had not yet experienced.

There were also other affects working with and in between me, Linda, and the violin teacher community we belong to. My supervisors had encouraged me to observe online lessons; however, I only found the courage and energy to do so by participating in a meeting for SMPA string teachers and realizing that I was not the only one struggling with online teaching and pandemic life. I imagine similar affects worked with Linda when we were talking, and that she, when we shared our troubles, found the courage and energy to let me into her lessons. As I wrote in Chapter 5 when explaining how this inquiry was done, my professional identity as a teacher might have been the reason some teachers declined, and others accepted my invitation to participate in this study. I think that meeting and talking with Linda allowed the affects to work between her and me in similar ways, which made it possible, although not easy, to arrange for the observations.

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Where Do We Meet? Part 3

"An audio recording of the lesson would have been very interesting," I continued. "Do you think it's possible for you to share your screen with me? You are using your iPad, right? On that, can you see both yourself and your student? Is there any way that I could see what you are seeing while listening? I have no need for it to be stored. I just need to see what you are doing. As if I was observing a normal lesson."

Linda sighed. "I'm thinking … these online lessons are, I don't know what words to use. Negative, maybe? It's not a good thing for the students that the lessons are online. I'm scared that you being there adds to the disadvantages of online teaching. I don't want them to be uncomfortable."

"I understand. An audio recording would also be very interesting. Or just interviews with you. I'm grateful for anything."

Linda started saying something but stopped. I reminded myself to keep quiet and to adjust to the pace of Zoom conversations. Then she continued.

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100   This expectation was communicated by the leaders of the SMPA where I worked at the time in meetings with us teachers. From reading online discussions among SMPA teachers all over Norway, it seems to me that other SMPA leaders also expressed similar expectations.

"I think it's possible both on Skype and FaceTime, to be more than two persons at the same meeting," she said. "Would you be interested in listening in and watching? That might be better for the students than if you recorded the lessons?"

"That would be great."

"Maybe you could do an audio recording?"

"Yes." I stopped for a moment, thinking hard. "If we could do a Skype or FaceTime meeting where I'm a participant, I could take notes and make an audio recording. And I could be on mute."

"And that would be better. You know, if something funny happens, like if a student farts or something, it would feel better to know that you are there with us and laughing with us, not listening and maybe laughing at us afterwards."

"You know the situation and the students, so it's up to you what you think would be best."

"I think that would be okay. I'm worried about the technical stuff, how to make it work. Maybe we could meet up before the lesson and test the technique?"

Relieved that Linda had found a solution, I thanked her again, and we arranged the time and date where I could join in on a lesson.

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When space was becoming something other than a fixed spatial container, like a home or a classroom, I was unable to imagine where to meet; this inability was affected by affects (the fear and despair of the situation), matter (the computers and all of the other technology producing the Zoom room), and discourses governing where a violin lesson might be held. Thus, the spatiality where we could meet was becoming through affective, material, and discursive intra-actions; it was not already there for us to enter. I think it is worth noting that Linda was more comfortable with me sitting in on the lessons after the intra-view. Through talking, we established a togetherness that opened the door to the lessons for me.[101]

I imagine that the troubling of space caused by the pandemic rattled not only my feeling of being in the world together but also that of many others. When many intra-actions were moved to online platforms, the ways in which we were accustomed to being together were troubled. The assumption that being together meant being together in a fixed space did not work, not in violin lessons and not in other situations. I continue this exploration of the becoming topology of space with a story of how a spider entered the lesson. In this section, I tell the story in Parts 1, 2, and 3; however, the spider returns toward the end of the next chapter as well as at the end of the dissertation.

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101   To open a door is not the same as entering the room behind the door, and not all who enter, enter the same room. In Chapter 11, I use Ahmed's (2017) examination of how doors work in exploring who enters the lessons and what lessons they enter.

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Playing With a Spider: Part 1

We were doing an online lesson together. Me, at home, sitting at a desk with two computers—one for looking at the video call of Linda and Freya and one for taking notes—and an audio recorder. Linda in her summer cottage. Freya, an 11-year-old girl, in her dad's bedroom. Linda had been instructing Freya to use her left arm in a swinging motion under the violin, like a hammock, while moving her fingers from one string to another.

"And now, we'll try to keep that motion while playing the scale. And also adding an element of timbre. What sound would you like to produce?"

"Hmm," Freya looked around her as if looking for the sound.

"You could find a musical name to it, or just have an idea inside your head," Linda suggested.

"Well," Freya spoke slowly, still looking around for the sound. Suddenly, she froze. "Oh my God! There's a spider here!" she said with urgency and fear in her voice. She took a couple of quick breaths. Pulling herself together, she continued: "Windy, maybe? I could play windy."

"Windy is a good suggestion. Do that."

Freya lifted her violin to play but stopped in midmotion. "It's huge!" Her attention was turned down to the left, somewhere outside of the camera's range.

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The spider must have been with Freya in the room for a while, unnoticed by Freya. By being noticed, the spider entered the lesson[102], and the affective forces working in the lesson changed. Freya moved from mildly interested in finding a musical timbre to terrified. Her body transformed from a state of being slightly restless, but relaxed, to being tensely still. Freya and the spider were in the lesson together. Pressingly, alarmingly, urgently together.

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Playing With a Spider: Part 2

"What do you want to do with it?" Linda asked calmly.

"Call dad?"[103]

"You do that!"

"But he's outside." Freya's eyes were still fixed at the (for me, unseen) spider.

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102   I re-turn to the question of being noticed—of becoming intelligible as a part of the lesson—in the story "Missing Stickers: Version 1" in Chapter 7 and in the section named "Entering Different Lessons" in Chapter 11.

103   The possibilities for a feminist unpacking of Freya calling her dad, and later of me calling my husband, to get rid of the spider are not lost on me. Nor are the possibilities for a multispecies reading of the story. But, due to the word limit of dissertations, I will have to leave those for the reader to ponder.

"I think you have to call him anyways. We'll not be able to work with that spider there."

"Right." Freya quickly put down her violin and disappeared into the white fog generated by Skype that obscured her background. Sometimes, it lifted and allowed me some random glimpses of a bed and a wardrobe.

Linda turned down her head to write on the practice plan she was preparing for Freya. "Timbre: Windy," she muttered.

Suddenly, Freya appeared in the fog. "I didn't see him anywhere. Oh, I feel stupid running out of the lesson like that."

"Well, where's the spider now? We might be able to deal with it ourselves," Linda said kindly.

Freya's breathing was quick and shallow. "There. On top of a book on the floor. I'll call dad on his phone; I don't know where he is." While talking, Freya quickly tapped her dad's number.

"Where are you?" she asked urgently.

From the dad's phone to Freya's phone to her computer to my computer (and from my audio recorder to my computer again when listening to the recording and writing the story), I heard her dad's calm voice. "On the roof."

"Our roof?"

"Yes."

"There's a spider here," Freya was talking so fast her words were almost strung together, "and it's scaring me. Could you please come?"

"No, you'll have to kill it yourself."

"It's huge!"

"But I can't. I'm on the roof secured by a climbing harness. I'm sorry, but I can't."

"Okay," Freya said slowly. "When are you coming back down?"

"In 15 minutes. Say hi to the spider for me." I thought I could hear a slight amusement in the dad's voice.

Freya's shoulders slumped. "Well, bye then," she said with a low voice.

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I was relieved that the spider was far off screen, unseen by me; Linda was calm and supportive, Freya was terrified, and her dad was slightly amused. The spider? I don't know. But although it was not moving, its intra-actions created a topology of space that made the space of the lesson become different for each of us while, at the same time, also shared. We were in the online lesson together, but of the humans involved, only Freya felt the spider's being so closely. The spatiality we shared was not a geometrical or bounded domain where distances were either far apart or close together, but it was a topological space where a particular connectivity of the manifold—such as the distance between Freya and the spider—was different than other connectivities. The proximity of the spider to Freya changed the timbre of the scale played.

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Playing With a Spider: Part 3

"If your dad couldn't help, then we'll just have to carry on and try not to notice the spider. I'm not afraid of spiders, you know," Linda said trying to comfort Freya. Freya stood quite still, her eyes still looking down and to the left, focused on a place outside the range of the camera.

"But I am," Freya replied quickly. Then she added: "We could try to continue playing." Her voice trailed off.

"You do that. Play that windy scale."

"Windy, right." With a sigh, still looking to the left, Freya picked up her violin and bow and played a scale. Her bow moved quickly, making a harsh sound. Sometimes it touched a neighboring string. Her movements were jolty and tense, her eyes on the spider.

"I saw you using a lot of bow but it didn't sound windy at all. Make it sound like the wind, please."

Freya tried again, this time with slightly less tension and fear. And again. Linda kept instructing her on how to angle her bow using only a few of the bow hairs on the string, to place the bow farther away from the bridge, to apply less pressure. Slowly, Freya's attention turned from the spider toward the scale and Linda's instructions, and her playing began to sound more and more windy.

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Having the violin lessons together with the spider changed how Freya played. Her movements became quicker, less precise, and more tense as her focus darted frequently back to the spider. Her ability to create a windy timbre was—in those particular intra-actions—lost. Gradually, intra-acting with Linda, the violin, the bow, the computer, and the spider, the sound became more and more windy. The spider, although I never saw it, was in the lesson with me in another way than it was for Freya. My body was not paralyzed with fear (not at that time, anyways) nor was Linda's. But Freya's body, the level of tension, the movements, the sound it made while playing, was transformed by the presence of the spider. We simultaneously shared and did not share the space of the lesson.

Another insight made possible by telling the story and reading it through agential realism and affect theory, is that the affects and intra-actions moving Freya's playing were not completely within her control nor completely outside of it. The agency—the ability to enact—was distributed across many intra-acting agencies, including the spider, and was not contingent on human intentions. I return to this insight in Chapters 8 and 9.

As these two stories and the diffractive reading of them through agential realism and affect theory have shown, the COVID-19 virus and the measurements to prevent its spreading troubled my previous understanding of space as a fixed container. It also troubled what it means to share a space and to be together within spatial boundaries. In the following section, I turn to how the temporal boundaries of violin lessons were also troubled by the virus.

Troubled Time

Like space, time is not "simply there as substance or measure, a background uniformly available to all beings as a reference or an ontological primitive against which change and statis can be measured (Barad, 2007, p. 180). But it used to work in ways that did not trouble my assumption of it being so. I used to think that time was ticking away. When I first read Barad's (2007) claim that "time is not a succession of evenly spaced intervals available as referent for all bodies" (p. 234), a voice in me answered, "Oh yeah? Have you ever played with a metronome?" The click-click-click of the metronome, its tempo indicated by beats per minute (BPM), creates evenly spaced intervals of time used as a referent by the playing bodies.[104] In the dissonance between Barad's writing and my immediate response lies the potential for developing insights into how time works and into the work time does in violin lessons. I begin this exploration by telling a story from the lessons held online where the metronome that was used became a monstrous metronome. Then, I tell a story of how I, when using a metronome to practice the same piece as played in the lessons, found the disciplining clicks comforting. By reading the stories diffractively through Barad's agential realist account of phenomena and apparatuses, I explore how temporality is becoming through the intra-actions of the lessons.

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Playing With a Monstrous Metronome

During the period of observing online lessons, Freya and Linda were working on the first movement of Violin Concerto No. 9 by Charles-Auguste de Bériot. As Freya played from the beginning of the concerto in one of the lessons, I read the sheet music. Linda had scanned her sheet music and sent it to me and Freya by e-mail. We each had, in our own houses, a printed copy.[105]

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104   Not all music relates to steady metronome beats, but in many genres, click tracks (a track with the sound of a metronome played in the headphones of the musicians) are used when recording to keep the different tracks synchronized. It is also common in many genres, including Western classical music, to practice using a metronome.

105   A scan of my copy is found in Appendix 10.

The words *Allegro Maestoso* were printed at the beginning of the first movement. *Allegro* indicates a tempo within the range of 120 BPM and 168 BPM while *Maestoso* suggests a majestic feel to the music. Two other tempo indications were also penciled in at the line where the solo violin part starts. The first said the eighth notes should be played at 88 BPM, and the other said that the fourth notes should be played at 66 BPM. Above the notes, helping the student understand the beats of the more difficult rhythmic passages, were lines indicating the relationship between the notes and the beat.

"What do you think is your biggest challenge in the first measure?" Linda asked Freya when she stopped playing.

"The break?"

"The break, that's right. To get that beat correct, you should put on your metronome and count to eight. Like this."

While talking, Linda turned on her metronome. I expected the clicks of the metronome to be evenly spaced out in a steady beat. They were not. Suddenly, one click jumped at me way too early. Then, another click was late, making me anxious and uncertain. Had the metronome stopped? Had the internet connection broken?

Not knowing how monstrous the clicks sounded to me, Linda demonstrated to Freya how to count before playing, Then, she played the measure with the metronome. To me, the random clicks were disturbing. For Linda, I guess the steady clicks were a help in keeping the beat steady. For Freya, I don't know. Did she listen to the clicks the same way as I did? Or were they uneven in a different way? Or maybe they arrived at her place in a steady beat?

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In this story, the voice in my head that answers Barad back is challenged. The metronome did not slice time into evenly spaced intervals in the way that I had presumed it would. Rather, the metronome produced uneven, monstrous clicks. To grapple with this, I return to the two-slit experiment and the insight it produced into the nature of measurement. If thinking of the metronome as an entity or measuring apparatus with fixed attributes and as separated from the object being measured—time—I would be right in expecting the metronome to slice time into evenly spaced intervals. But this expectation falters if I think of the metronome as part of a phenomenon.

Phenomena are "the basic units of existence" (Barad, 2007, p. 333), and they consist of intra-acting agencies. Apparatuses "which are themselves phenomena, are (also) part of the phenomena they produce: phenomena are forever being reenfolded and reformed" (p. 177). Thus, the apparatus in question (the metronome) is not outside of the object being measured (the time). Rather, the metronome and the clicks it produces are components of the phenomena

in question. The components of the phenomena are not pre-existing; they are produced by agential cuts that "cut together-apart (one move)" (Barad, 2014, p. 168). When taking the phenomena consisting of intra-acting agencies as the primary ontological unit, the clicks of the monstrous metronome are not only produced by the metronome but also by computers, Wi-Fi networks, online meeting rooms, and an expectation that the clicks would be even. As we—Freya, Linda, and I—were together-apart, simultaneously in a shared online room and in separate rooms, the clicks were differentially produced for all of us.

When I first grappled with this differential becoming of sound by reading the stories from online lessons through agential realism, I assumed my thoughts were novel. But then I recognized them as thoughts, or rather as practices, familiar to me as a musician and as a teacher. As a musician, I take into account how sound travels in a room, how low frequencies travel slower than high ones, and how the distances between players affect the timing of the playing. As a teacher, I take into account how different students with different abilities and at different developmental stages perceive sound, be it music or words, differently. Both as a musician and as a teacher, I relate to the instruments and the rooms, as well as the possibilities and impossibilities they offer for producing sound. And I relate to the changing rules for music, the ones I grappled with in the beginning of Chapter 3. When I am teaching and playing, sound is and has always been becoming through shifting intra-actions. As the agential realist concepts started working with me and through me, the intra-acting sound also entered into my research.

The many tempo indications in the sheet music exist as yet another temporal aspect worth exploring in this story. The sheet music had printed and penciled tempo notations. The different shades of gray and the different handwriting styles suggested that they were added at different times and by different hands.[106] Both in the differentially becoming metronome clicks and in the collaborative tempo indications in the sheet music, there are aspects of togetherness. There are also aspects of power. Freya was told to use the metronome, and I learned, from other lessons where this was an issue, that she was not particularly fond of doing so. I, on the other hand, found comfort in practicing with a metronome.

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106   I engage with the composer Bériot and the editor Pollitzer as well as the generations of teachers and students marking the sheet music in Chapter 8 where I explore the strings of my violin.

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Playing With a Comforting Metronome

Practice Diary February 5, 2021

I practice the third and fourth bars of the second page of Bériot using a metronome app. The beats discipline me, making the spaces available for the sound, the movement, and the thinking-doing small and fixed and evenly spaced out. The sound of click-click-click makes me anxious. I have to do all of the movements of the fingers and the bow within the given time. But the clicks also support me, giving me a sense of purpose and direction. I know that if I can put the right notes in between the clicks, then I'm doing something right. The BPM notated gives me a goal to work toward. And I know that the tempo I set the metronome at is the tempo notated by someone's hand in the sheet music. Whose hand, I don't know. But at this time in the period of social lockdown, I'm not picky about who keeps me company. I continue practicing, pushing the tempo up two PBM at the time. I get a sense of flow, of doing what is supposed to be done. I feel like I'm working, and I like it.

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In this practice session, I appreciated the structure of the metronome and the company of playing to someone's instructions. When practicing with the metronome, I found that it structured my movements and my playing. It created possibilities and impossibilities. Much like the lines in a coloring book sometimes feel like welcome guidance and sometimes like a prison, the clicks of the metronome created lines that structured my playing. The visible lines marked in the sheet music by someone's pencil above the particularly difficult rhythms corresponded with the audible lines of the metronome. But if we leave behind the atomic worldview—where entities pre-exist with inherent traits—then these lines and clicks are not already there. They are becoming in intra-actions. In these intra-actions, there are power relations. Who or what put in the tempo markings? Invented the metronome? Who or what decides when to practice with it and when not to; when to play in a metronomic tempo and when to play rubato?[107]

In my practice session, when I was alone in my house during one of the many social lockdowns during this period, the power structures of violin lessons were not very pressing. In practicing with the metronome, I found a sense of purpose and belonging that I was craving and searching for. In other contexts, I might have found—and I have memories of doing so as a student—practicing with a metronome restricting, limiting of my expressive freedom, and as an act of unwelcome execution of power from teachers and their norms of violin playing.

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107   To play rubato is to slow down and speed up the tempo to create musical expressions.

I have very little insight into how Freya found the metronome to work, and how the metronome was becoming in her dad's bedroom during that particular lesson. Thinking with the feminist notion of difference as not oppositional (Barad, 2014; Haraway, 1992; Trinh, 1991/1997) and with phenomena as the primary ontological unit (Barad, 2007), it becomes possible to stay with the trouble of the undetermined nature of the metronome. The concept of time in the violin lessons, made tangible by the clicks of the metronome, can become both evenly spaced intervals arranged in a neat and tidy line functioning as a referent for bodies and differential clicks that are monstrous and messy.

The insight into the differential and topological becoming of time and space produced by these diffractive readings troubles the notion of togetherness. If space is not a container and time is not linear, how could we be in a lesson together? In the last section of this chapter, I explore how togetherness is troubled when engaging with the changing topology of space and time.

Troubled Togetherness

In the two previous sections, I explored the troubled space and time created by the COVID-19 virus through telling stories from online lessons and reading them diffractively through agential realism and affect theory. In these readings, a pattern of troubled togetherness appears. If space and time are not pre-existing containers, how can we be together? What are we together in? To help me grapple with the concept of togetherness—of being together in space and time—I turn to Le Guin and her carrier bag theory of fiction (1986/2019), and to the Sámi concepts of *oktavuohta* (Jensen, 2020) and *Siida* (Kramvig & Flemmen, 2019).

Being together holds connotations of being together in something. We are together in a room, in an activity, in proximity. We are together within some kind of a container, in something that holds us together. But what is a container? In her essay "A Carrier Bag Theory of Fiction," Le Guin (1986/2019) rewrites the history of humans and human storytelling. Rather than telling the story of sticks and spears, she turns our attention to what, she argues, must be the first cultural device. "A lead a gourd a shell a net a bag a sling a sack a bottle a pot a box a container. A holder. A recipient." (p. 29). Furthermore, containers are made with and around their content. Rather than being empty vessels waiting to be filled, they take shape from what they contain. Through Le Guin's writing, the act of gathering, of putting assorted things into containers and bringing them home to share and to marvel over, becomes another way of being human. She critiques the trope of the spear hunting hero that kills animals alone and

instead argues for the communal and cooperative act of gathering, storing, and sharing as a better way to be human.

Being together is analogous to sharing a container: it could be a room, a space, a time, or something that sets boundaries that we are within. But thinking with Le Guin's essay as well as Barad's agential realist notion of spacetimematter means that the container we are within is not necessarily already there before we are within it. It could be a container becoming around us, creating the togetherness. And the container could be something other than a room or a unified space. It could be an online meeting room. Or a story.

Yet another aspect of togetherness, of what it means to be together in a violin lesson and how we are doing togetherness, emerges as I turn to the work of Sámi scholars. Sámi concepts hold stories, meanings, and connections to Sámi ways of living and thinking that make the concepts not translatable to other languages and other contexts (Gaski, 2017). Thus, they are not transferrable to the context of violin lessons. But reading Sámi concepts of togetherness diffractively through the stories of troubled togetherness might generate other insights into what it means to do violin lessons together.

Building on Indigenous studies scholars and the storytelling methodology developed, Jensen (2020) suggests *oktavuohta*—translated as connection, togetherness, and belonging—as a way toward advancing Sámi scholarship and integrating personal narratives and family stories in reparative practices and generative scholarship. "Oktavuohta is an idea that transcends many cultures. Togetherness reflects the meaning better than unity, because unity can be forced, it can be uneven, political, or institutional" (Mathisen, referred by Jensen, p. 19.) Oktavuohta or togetherness is made and remade through telling stories of land, identity, and community.

A similar Sámi concept is *Siida*.[108] Used in contemporary administration documents and debates, a Siida is a district or a specific area where the reindeer of a family or community are given the right to graze. But a Siida is much more complex than a geographical area. A Siida is a social, historical, and geographical "organizing device for the nomadic Sámi people's relationship with land, animals and settlers" (Kramvig & Flemmen, 2019, p. 68). A Siida is constituted by the seasons and the movements between pastures, by family ties and friendships, and by political and historical relations. Thus, the Siida becomes more than a social or geographical or historical entity. It becomes an entanglement of many moving parts and has boundaries that are made and remade by the humans and the nonhumans—animals, places, and spirits—involved (Kramvig & Flemmen, 2019).

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108 I follow the practice by Kramvig and Flemmen (2019) of capitalizing the term.

The complex ways in which Siida and oktavuohta are becoming through entangled stories of land, identity, and community and through relations to land, seasons, and animals might generate more complex insights into the togetherness of violin lessons. The togetherness conceptualized as oktavuohta or Siida transcends space and time; it is done in a shifting topology of spacetimematter and it transcends human exceptionalism. But the Sámi concepts of togetherness are not detached from spatiality and temporality even though they transcend the conceptualization of space and time as containers. Both Siida and oktavuohta are intimately connected to land and how humans and animals move through it, and to how we move in and become with time. I imagine this connection to space and time, or rather to how space and time are becoming, might be part of the reason that online teaching felt draining. When time and space are troubled, it is no wonder we feel tired, frustrated, and distanced.

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Tired of Zoom

"Let's talk of the practical stuff," I asked Linda after she had told me a bit about her education and teaching experience in our first interview. It was in the early days of online teaching. "What platforms and what equipment are you using for online lessons?"

"I have tried many different platforms. I know some teachers tried Whereby first and then continued using that for all their students. And I heard some say that Zoom was the thing, so I tried that. But I couldn't make it work properly. I tried asking my colleagues and in Facebook groups and everybody said I had to turn on original sound. But that does not help if the students don't not do the same thing. And all of them are on different versions of Zoom and some use their phones and some their iPads, and some have really old tablets. It's not working for me. I get so tired!"

Linda looked tired and exhausted when telling me about this. I knew the exact feeling as I had been teaching online for some weeks myself.

"It's not that I need the sound to be of high quality to work on the sound the students produce when playing," Linda continued. "I know how they sound by looking at their bows. I know how the angle between the bow and the string should be and where the bow should be placed in relation to the bridge to produce a good sound. But I get really, really, tired when the sound is cut off all the time. Zoom is made like that, you know, and it makes me stand like this."

Linda leaned into the camera, almost coming out of my screen.

"I want so badly to reach them, and I raise my voice and I get very, very tired in a physical way."

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Thinking of sound—like space, time, and matter—as becoming through intra-actions, I might think of Linda's frustration with online lessons as created by the unexpectedness of the sound. Some aspects of violin teaching—like the angle of the bow—were what she expected them to be, while others—like the sound—were not. The software of Zoom is designed to eliminate sustained background noise to make conversations easier and does not differentiate between background noise and the sustained tones of a violin. Thus, it cut off the sound, making Linda tired. When face-to-face in a room with the student, the sound is also becoming through intra-acting agencies. But then, the becoming is familiar to us. What we expect the sound to become and what it becomes are mostly in agreement.

Like Linda, I also found Zoom lessons to be exhausting in a physical way. When teaching online, I found that my body became stiff and painful. After trying to figure out why, I noticed that I used my body differently when playing for the camera than when playing for a student. The camera fixed my body and its movements, directing them toward the small circle of the camera. To play in a free, unrestricted, moveable, and relaxed manner is the ideal way to play not only because it produces good sound but also because it puts less strain on the body. As the camera restricted my movements, my levels of pain and discomfort increased. The togetherness created in the online room, a togetherness limited to what the camera could capture, materialized in my body as stiffness and pain.

Linda also mentioned how she had an urge to reach the students but wasn't able to. Returning to the Sámi concepts of oktavuohta and Siida, I notice how some of the conditions for experiencing togetherness that these concepts highlight are troubled while others are not. The troubled temporality changed the feeling of listening to sounds that had been heard many times before, as was demonstrated in the story of the monstrous metronome. The stories of the spider demonstrated how Linda and Freya, although together in the lessons, were also not together with the spider in the same ways. But Freya and Linda share a history of many years of doing lessons together, they share an embeddedness in a tradition of violin playing, and they share expectations of how a violin lesson is done. They have years and years of togetherness to draw on.

If I turn to affect theory and its interest in how forces work between and with bodies, I might grapple with how the unpredictable and unexpected way time is becoming and the impossibility of physically touching the students might be troubling the affects that are moving between Linda and Freya. When Linda told me that she felt like she couldn't reach the students and that it made her tired trying to do so, I recognized her feelings. At that point, we were weeks into our first lockdown. One year later, when I had lost count of how many periods of full or partial lockdown we had been through, my feeling of tiredness had turned into resentment.

I resented doing online lessons. I resented trying to reach my students, trying to be together with them, trying to share energy and the joy of playing.

• • •

Fuck Zoom!

Research Diary January 27, 2021
Fuck! I felt the knot in my stomach tighten as I saw the student's name appear on the screen. *Alice has entered the waiting room*. Two minutes left before the lesson was about to start. I let her wait. I lifted my phone, scrolling Facebook for the millionth time this day, trying not to think of the lesson that was about to start. My neck hurt. My eyes were sore. I heard my children fighting with my husband over their home school assignments.

One minute left. I checked the online newspapers. How many COVID-19 cases today? Too many. I scrolled Facebook again. The feed was filled with COVID-19-related news.

And then, on the dot, I put down my phone, straightened my back, put on my smiley teacher face, and admitted the student into my Zoom meeting room.

"Hi, how nice to see you! Oh, are you in your bedroom today? How are you?"

I did my best to connect with her, to make her feel appreciated and welcomed, and not to let her know that I hate, really, really hate, online teaching.

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Affects are the forces working with and between bodies. What about when the forces are altered? When they are not moving between bodies, but filtered and distorted through the materiality of online meeting rooms? Were there affects working in the short diary entry? If I think of bodies as both human and nonhuman, then there were affects working between me, my phone, and my computer. In the student's bedroom, her body was affected by and affecting her computer. But what about the two of us? Were there affects moving from me to the students? Or from the students to me? There might have been, but in the situation discussed above, it felt like there weren't. Or at least like there were very few, and they felt like the result of hard work.

To read the way Linda articulated her experiences with online lessons, the stories I have told from them, and my diary entry diffractively through Barad's notion of spacetimematter, the Sámi concepts of oktavuohta and Siida, and the carrier bag theory of fiction creates a pattern of troubled togetherness. The ways we were together in violin lessons before the pandemic did

not work when the materiality of the lessons changed. To be in the lesson, to share the same time and space, stopped working like it used to. That is not to say that it stopped working altogether. As I have explored, it worked in other ways. But this unfamiliarity and trouble took its toll and created affects of tiredness and resentment. These affects have been experienced by others as well. Zoom fatigue has become a term for the feeling of exhaustion that the use of online meeting tools might cause (Bailenson, 2021; Fauville et al., 2021a, 2021b).

Staying With the Trouble

Rather than provide answers to how violin lessons are enacted and what they produce, this chapter has explored the troubles caused by the COVID-19 virus and how they forced me to conceptualize the spatial and temporal boundaries of violin lessons as becoming through intra-actions. As the spatial and temporal boundaries of violin lessons shifted, our conception of being and feeling together in a lesson also changed. Through telling stories from online lessons and reading them diffractively through the agential realist notion of spacetimematter, affect theory, the Sámi concepts of oktavuohta and Siida, and the carrier bag theory of fiction, patterns of troubled togetherness have emerged. The stories and the reading of them through theoretical concepts have contested the Western epistemologies that rely on an understanding of space as a container or context; of time as linear, predictable, and progressing; and of matter as pre-existing *in* space and time (Barad, 2007).

In this chapter, I have offered insight into how the spatial and temporal boundaries of violin lessons are becoming through intra-actions, and of how they are iteratively changing. In the following chapter, I bring these insights into stories told from face-to-face lessons and I explore their shifting topology of space and time.

Chapter 7: The Topology of Violin Lessons

Trouble works, like space and time, in ever shifting topologies and not in confined boxes and predictable lines. When the COVID-19 virus and the move to online platforms troubled my assumptions about space and time, the trouble doubled back to the face-to-face lessons I had observed and to the audio recordings, fieldnotes, stories, and diary entries that had materialized. The virus, through the understanding of the agential realist conception of spacetimematter it generated, changed the stories I had already written and the reading I was in the process of doing. The geometrical notion of space and time lost its privileged position in my thinking, and a topological understanding emerged. Thus, the connectivities of the stories—the order in which they are placed in the dissertation and the order in which the events took place—are different but not in opposition.

The previous chapter contested the Western epistemologies that rely on an understanding of space as a container or context; of time as linear, predictable, and progressing; and of matter as pre-existing *in* space and time (Barad, 2007). In this chapter, I put this new insight to work as I tell and read diffractive stories from face-to-face violin lessons and explore the topological questions of boundary, connectivity, interiority, and exteriority that must supplement and rework geometrical questions of bounded size and shape (Barad, 2007).

The diffractive reading aims to explore the agencies intra-acting and creating the spatial and temporal boundaries of violin lessons. The insights I develop in this chapter are fundamental to the chapters investigating the differential becomings of violinists. By understanding these becomings, I endeavor "to get at how worlds are made and unmade, in order to participate in the process, in order to foster some forms of life and not others" (Haraway, 1994, p. 63), so that this understanding might lead to a more response-able music education.

In the first part of this chapter, I turn to the temporal boundaries of violin lessons and explore how the lessons, rather than beginning or ending at fixed times, have porous beginnings and endings. Then, I turn to the way time is tentacular and I explore the strings connecting past, present, and future in unexpected ways. In the second part, I re-turn to the porous boundaries of violin lessons, this time paying particular attention to the spatial boundaries and how they work to include and exclude agencies from taking part in the lessons. In the third section, the spider from the lessons with Freya and Linda returns to remind us of how the boundaries of space and time are becoming in entanglement with each other.

The Temporal Boundaries

Before starting on the storytelling, I want to re-turn to the agential realist concept of boundaries that builds on quantum physics experiments with waves. When light waves meet an obstacle and a shadow is created, the boundaries of this shadow are not fixed and demarcated by definite lines. Rather, the boundary it is a diffractive pattern of alternating bands of light and darkness (Barad, 2007). "There is no sharp boundary separating the light from the darkness: light appears within the darkness within the light within …" (Barad, 2014, p. 170, ellipsis in original). This insight, along with Barad's performative worldview where the world is becoming, invites an exploration of how boundaries of violin lessons are becoming *and* what they are becoming.

In the following section, I explore the temporal boundaries of violin lessons by exploring their porous beginnings and endings through a diffractive reading of stories through theory. In diffractive readings, no text is privileged over another. In the previous chapter, I started from stories. In this section, I take the writing of Barad as a starting point. In their paper "Troubling Time/s and Ecologies of Nothingness: Re-Turning, Re-Membering, and Facing the Incalculable," Barad reads insights from quantum field theory and Hayashi's (2010) account of the destruction wrought from the Nagasaki bombing through one another.

> In these troubling times, the urgency to trouble time, to shake it to its core, and to produce collective imaginaries that undo pervasive conceptions of temporality that take progress as inevitable and the past as something that has passed and is no longer with us is something so tangible, so visceral, that it can be felt in our individual and collective bodies. (Barad, 2017, p. 57)

What Barad describes as a temporality that takes progress as inevitable is the dominant conceptualization of time in music education research.[109] In Chapter 2, I argued that SMPA-related research conceptualizes knowledge as linear, individual, and representational (e.g., Björk et al., 2021; Karlsen & Nielsen, 2021). This dominant perception of knowledge views it as a unilinear development toward progress, even though the act of acquiring knowledge might be perceived as complex and working on multiple levels and in multiple ways. Still, students must progress and move toward the goals of education. Likewise, there is an assumption that the past gets left behind as we progress. This conception of time as linear and as moving in one direction relies on a geometrical understanding of time. In this understanding of time, a lesson has either begun or has not. And when the lesson ends, it has ended.

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109 It is also prominent in education in general and found in figurations such as the developmental child in early childhood education (Osgood & Odegard, 2022).

This conception of time as either there or not there relies on one of many binaries troubled by agential realism, but also by my experiences. In the lessons I observed, and in the lessons I have lived with all of my life, the past was never left behind (Barad, 2007). My teacher's teachers were present in our lessons as a child, like my teacher is present in the lessons I teach now, through expressions, body movements, and photocopied sheet music with generations of notes and drawings on them. The future has never been what will come to be in the unfolding of the present moment. The possible futures were always moving and becoming. When my teacher introduced me to the Mozart violin concerto that I would play for auditions years later, some possible futures were created while others were not. Time is, and has always been, topological.

Barad's topological understanding of temporality privileges questions of connectivity and relationality over questions of bounded domains and fixed distances. This reworking of time is related to diffraction.

> Diffraction is not a singular event that happens in space and time; rather, it is a dynamism that is integral to spacetimemattering. Diffractions are untimely. Time is out of joint; it is diffracted, broken apart in different directions, non-contemporaneous with itself. (Barad, 2014, p. 169)

Untimely diffractions are integral to spacetimemattering. This is quite a mouthful, and it is no wonder it took me a long time to make Barad's thoughts work with me and for me when doing inquiry. These are indeed troubling thoughts. As I was troubled and let myself be troubled by reading Barad and living through the pandemic, my understanding of time shifted. Or, rather, my articulated understanding of time moved toward the bodily and performative understanding of time I already had had as a violin teacher. In teaching, learning, and playing, time was always and already out of joint and broken apart. But as the past is never left behind (Barad, 2007), I bring both the linear and geometrical concept of time *and* the diffractive and topological concept of time with me in the following section as I explore the fringed beginnings of violin lessons.

One of these fringed beginning happened in one of the lessons with Marianne, the teacher, and her two students Sarah and Olivia. They were both girls at the age of 8, and they had been playing for almost two years. The lessons were held at their school after school hours, and they both participated in the after-school leisure program at their school.

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Porous Boundaries: Version 1[110]

Marianne had arranged the furniture in the room to make space for the lesson. She had put up the music stand, tuned her violin, and organized her sheet music. I had started my recorder, opened my notebook, and taken my place in the back of the classroom. The door to the hallway was open. We were ready for the lesson to start. But there were no students in sight.

Marianne looked up at the clock that hung above the door and was just about to open her mouth to speak when we heard running footsteps.

"You must come with me!" Sarah started speaking almost before she saw Marianne. "They are saying that Olivia doesn't take violin lessons!"

"That's nonsense. She's been playing all year." Marianne looked surprised.

"I know!" answered Sarah.

"Who said she's not playing?"

"The grown-ups." Sarah was referring to the staff at the after-school program, and her face clearly revealed what she thought of them.

"Should I go talk to them? I'll do that." Marianne picked up her keys and walked to the door.

Sarah let down her shoulders, clearly relieved that Marianne was taking action to resolve the situation. "Olivia is very upset they said so."

"Of course she is," said Marianne soothingly. Then she stopped, turned, and looked more closely at Sarah. "By the way, did you bring your violin?"

"No, I forgot it at home because I rode my bike to school."

"Oh, did you? Use this today." Marianne walked back to the cupboard and found a violin. "You stay here and unpack this violin," she said, moving toward the door again. She almost walked into Olivia storming in.

"Finally!" Olivia was visibly frustrated and mad.

"I was just about to go and get you. What happened?"

"The adults said I should have my lesson in one hour, but I knew I should be here now." Olivia's arms were crossed, and her whole body radiated anger.

"How strange!"

"They didn't listen to me!"

"Very strange."

They both looked at each other, Olivia angry and Marianne puzzled. The sound of Sarah playing pizzicato on her borrowed violin snapped Olivia out of her anger. "Oh, I forgot my violin."

With endless patience, Marianne asked smilingly: "Is it upstairs? Do you dare to go up again, or would you like to borrow one from the cupboard? Actually, you should borrow today. We are running out of time." Marianne started opening a violin case lying nearby.

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110   I tell this story in another version in the second part of the chapter.

"But Amina is not here today because she is celebrating Eid. We could use her time," Sarah said helpfully.

"Oh, so we have plenty of time? How nice!" Marianne put down the violin and turned toward Olivia. "You know, since we have extra time, you should go and get your violin from the classroom. Or would you like me to get it?"

"Could you do that for me?" Olivia asked gratefully.

"Yes, we wouldn't want you to get all upset again." Marianne smiled. "Is it outside the classroom or inside?" she asked as she walked toward the door for the third time, this time not turning back.

Sarah started playing the song from the last lesson on her borrowed violin. Olivia picked up the violin from the case Marianne had opened and joined her.

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What I expected to be a lesson beginning at the assigned time for the lesson turned out to be something else. In the next section, I explore the porous temporal boundaries of the lesson. Inspired by Haraway's concept of SF as a method of tracing or following a string in order to find tangles and patterns and to stay with the trouble they cause (Haraway, 2016), I will pluck at the strings of this story, looking for what more there is to find while taking absences—the students, violins, and teachers not there—as a starting point.

One temporal boundary of the lesson materialized as the agencies of the room arrived at the position where they were ready to start the lesson. The furniture, the teacher, the researcher, the arms of the clock—they were all ready. But Sarah and Olivia were missing. Their absence was noted by Marianne, and she was about to speak when Sarah arrived. On similar occasions, Marianne (as well as Astrid who also taught students participating in the after-school leisure program) had walked out to find her students so the lesson could start. But before she could do that in the story above, Sarah entered, angry and bewildered, and explained why Olivia could not come. After listening to Sarah's explanation, Marianne was about to walk out the door to resolve the situation. But by entering the room, Sarah had introduced a new absence: She had not brought her violin. When Marianne noticed this, she stopped her movements toward the door. Although she was not asked by Marianne, Sarah explained why she had not brought her violin, creating a cascade of questions.

Why had Sarah ridden her bike? I do not know, but I could imagine many possible reasons. Maybe she had been running late that morning and took the bike to get to school in time. But then, why was she late? In pondering possible answers to this, my assumptions of her life

based on the intersections of race, gender, and class come into play:[111] images emerge of her living with a single parent with several children, having parents who work the night shift, or having extended responsibility of younger siblings. Or maybe Sarah had just wanted to ride the bike—perhaps it was more fun—and had forgotten her violin. Or she might have left the violin on purpose as she did not want to have her lesson, using the bike as an excuse. Or she might have gotten a new bike the day before and really wanted to show it to her friends and rode it while feeling guilty for not bringing the violin. Or there might be a number of other reasons why she had ridden the bike and had not brought the violin. All of them highlight how the beginning of the lesson is not a fixed boundary, but a fringed boundary entangled with a number of other points in the topology of space and time.

When Olivia arrived, Marianne stopped moving toward the door for the third time. For a moment, it looked like the lesson was about to start as both the students and the teacher were present. But the violins were not. Marianne's initial thought was to go and get Olivia's violin,[112] but then she remembered the linear time regulating the lessons and stated that they were running out of time.

Then, yet another absence took part in creating the temporal boundaries of the lesson. Amina, the student who normally came after Sarah and Olivia, was not at school because she was celebrating Eid-al-Fitr, an Islamic holiday celebrated to mark the end of the fasting month of Ramadan. The date of Eid is determined by the lunar phases and the observation of the first crescent of a new moon. Thus, it does not fall on the same date in the Gregorian calendar every year and different Islamic denominations might celebrate it on different dates. Realizing that she could stretch Sarah's and Olivia's lesson into the time usually reserved for Amina's lesson, Marianne decided to go and fetch Olivia's missing violin. By doing so, another fringe of the temporal boundaries of the lesson was created by the intra-actions of the moon, Islamic faith, and Marianne's wish for Olivia to play her own violin.

A third absence working in this story was the absence of Marianne as she left to find Olivia's violin. Left to their own devices, Sarah and Olivia used the borrowed violins to start playing the song they had practiced in the previous lesson. Another fringe in the temporal boundaries of the lessons became as they started the lesson without their teacher. Or, if thinking with time as topology, maybe they did start with their teacher. Marianne was there through the room she had prepared, the space she had set up for a violin lesson, the sheet music, and the habits and traditions created by, among other agencies, her.

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111 I explore these intersecting categories and their role in the differential becomings of violinists in Chapter 11.

112 In Chapter 9, I explore how the materiality of specific violins matter. In Chapter 11, I explore how missing violins—as in this lesson—and violins in surplus—as in one of the other lessons—are part of the differential becomings of violinists.

This story and the diffractive reading of it center the absences and how they take part in creating the porous temporal boundaries of violin lessons; this thinking relates to the diffractive pattern of alternating light and shadow, beginnings and non-beginnings, created by light waves. Through the reading, a more complex insight into the temporal boundaries of violin lessons emerges. The reading also highlights how Marianne moved in this complex landscape with great response-ability—with great ability to respond to the shifting intra-actions—and with care for her students. In the next section, I expand our understanding of the temporal boundaries of violin lessons by exploring their tentacles as they stretch into pasts and futures.

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Tentacular Time: Version 1, Part 1[113]

One morning in the spring of 2021, I was listening to the tape of an online lesson that took place one year earlier. And it took place again, in a new form, as I listened to it.

Freya had played a scale and she was about to play it again. This time, Linda asked her to find a technical element to focus her attention on. Freya had a hard time deciding which one.

"Could I suggest something?" Linda asked. "You played Kreutzer E major last lesson, and we talked about how to steer your arm, didn't we? When you are playing on the G string, you are here," Linda held her violin at her shoulder and showed how her arm moved sideways under it, enabling the fingers to reach the G string. "And you move your arm like this. You try."

While listening to the tape, I stood up and reached for the Kreutzer etudes on my music stand. Which one was the E major again? I flipped through the pages and found it. Aha, that one. Number 8. Right, I remember that one.

To apply for higher music education, a person must play at the audition from a specific repertoire based on their instrument. Violinists are usually required to play scales and etudes as well as the first movement of a Mozart violin concerto, a movement from the solo violin works of Bach, and one romantic piece. Kreutzer Number 8 was one of the etudes I prepared for auditions as an adolescent hoping to become a music student. I practiced the etude for years and played it at several auditions. As I saw the sheet music, memories of practicing became a part of the present, and I felt a tinge of the nervous flutter, and sometimes panic, that auditions had brought with them.

Linda's voice drew me back to the recorded lesson. "Do you have Kreutzer there with you?"

Freya looked around her. "Yeah, it is here somewhere." Freya knocked down her music stand, lifted it again, and found the sheet music she was looking for. As she flipped through it, Linda played the opening bar.

"Aha, that one. Number 8, right?" Freya said.

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113   I tell this story in another version in Chapter 10.

"Yes. Have you written anything about steering of the arm? I might have confused you with another student."

"No, it only says middle to tip," answered Freya.

"Oh, well, then you learn it today. In this piece, you must play a very high third finger on the G sharp. And to reach that one, you need to move your left arm."

Taking in the instructions, Freya started to play. Listening to her, I felt my third finger stretch and my arm move. Looking down at the arm, I noticed how the movement was not visible. It was my imaginary third finger and my imaginary arm that were moving through the activity in my brain and my nervous system, and not the actual muscles of the arm and finger. My hands, in that moment, were busy typing.[114]

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Time is tentacular in the sense that time stretches out into the past and the future, enfolding and unfolding in multiple ways creating connections and strings. In this story, there is one line of time materialized by the audio recording. But that string of time is entangled with the time that existed while I sat writing the story, feeling the affects of the auditions elevate my heartbeat, and the memory of playing the G sharp of the etude move my fingers. And it is entangled with all the other times the story has been rewritten and re-turned to. As exemplified by the movement of my fingers, these entanglements might take the form of bodily re-memberings (Barad, 2017).

Barad (2017) suggests re-membering as a practice of seeking to do justice for the devastation wrought by colonialism, war, nuclear physics research, and environmental destruction. My grappling with the tentacular time of violin lessons might seem like an unworthy topic when it is set against the profound and important questions that Barad's essay engages with. But rather than be paralyzed by a dichotomous way of thinking of topics as important or unimportant, I take Barad's work as an invitation to think deeply and seriously about how time is working in violin lessons through engaging with their practice of re-membering.

To re-member "is a bodily act of re-turning" (Barad, 2017, p. 84). The act of re-turning is not an act of reflecting or going back to the same moment that we once encountered. Re-turning is "turning it over and over again—iteratively intra-acting, re-diffracting, diffracting anew, in the making of new temporalities (spacetimematterings), new diffraction patterns" (Barad, 2014, p. 168). In re-turning and re-membering, we are making something anew *and* re-turning to that which was already there. This is in line with the quantum understanding of diffraction,

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114   This story, exploring one temporal configuration, is told in another way in Chapter 10 when I explore the becomings of professional violinists.

which "troubles the very notion of *dicho-tomy*—cutting in two—as a singular act of absolute differentiation fracturing this from that, now from then" (p. 168, emphasis in original). To re-member is not an act of going back "but rather about the material reconfiguring of space-timemattering" (Barad, 2017, p. 63).

I want to direct our attention to the bodily aspects of re-membering as it became tangible in the story I told. As I listened to the recording, as I re-membered the event, I listened by finding the sheet music, by flipping through the pages. This is a bodily doing, a bodily re-turning. I also listened by experiencing the affects of auditions: the nervousness, the elevated heartbeat, the feeling of being evaluated. These affects were not the same when I was writing the story as they were when I auditioned; they did not work with me and on me in the same way. They were re-membered. Another way the re-membering became bodily occurred in the imagined movement of my fingers. Or, perhaps, the movement was not imagined. I did move my fingers, and I did not. My movements, done as a re-membering of movement and the affects of auditions, became a part of the material reconfiguring of spacetimemattering as I listened to the recording of the lesson.

Because the past is never left behind, the event stayed with me and worked with me until later that day when my children were in bed. Then, it was time for me to practice on my violin, which added another level of embodied re-membering.

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Tentacular Time: Version 1, Part 2

The idea of consciously placing the arm under the string was playing on my mind as I played the second phrase of the first movement of the third violin concerto by Mozart, the one I had practiced in Berlin when I struggled to get the sixteenth notes right. The second phrase of the violin solo part starts with a chord played on three strings. The two lower strings are open, and the third string, the E string, is stopped by the third finger.

The lesson I had observed a year ago and listened to that day, as well as the thoughts and the imaginary movements it generated, lingered as I practiced. Suddenly, I had an epiphany of how I, when playing that particular chord, had never before contemplated how the right arm and the left arm were not mimicking each other's movements. Normally, the arm that guides the bow across the strings and the other arm that guides the fingers across the strings are working in the same direction because the bow and the fingers are playing the same string. But not for this particular chord!

The revelation made me smile and try again. As I played the chord, this time mindfully placing the left arm under the E string but the right arm in a position making the bow play the three strings, I felt something lift. The weight of expectations—this chord is played during the first few seconds of the piece I was always asked to play first at auditions—and of failure—I never felt at ease playing the sixteenth notes coming after the chord—fell off of my shoulders. I felt my breath deepen and heard the timbre of my violin gain a depth I had not heard before.

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The bodily aspect of re-membering implies that different bodies re-member differently. As I try to make tangible my embodied re-membering for a reader, I keep in mind that the reader's body might not have the experience of playing the violin or might have a different experience of violin playing. The entanglement of the body—the movement of the arms and the depth of the breath—and the culture it is embedded in—the practice of auditioning for music education—create an entanglement of material, discursive, and affective practices that is specific to violin playing. But the bodily aspects of re-membering are relevant for all educational practices that aim to take seriously the idea that we do not leave the past behind, and, instead, that the past is always part of the becoming of the present moment.

> *Memory—the pattern of sedimented enfoldings of iterative intra-activity—is written into the fabric of the world.* The world 'holds' the memory of all traces; or rather, the world *is* its memory (enfolded materialisation). (Barad, 2010, p. 261, emphasis in original)

The body I was playing with was playing with layers of re-membered affects and movements. These are not purely bodily nor purely cognitive. They are entangled materialdiscursive practices. And they are not confined in a container model of time. The temporality working is tentacular: It stretches into the past and the future, creating topological connections that transcend linear time. By reading Barad's texts through stories, I have explored how the temporal boundaries of violin lessons are porous and tentacular, and how they become in intra-actions. As I re-turn to the story of the porous boundaries—the story where first Sarah and then Olivia arrived without their violins—I turn our attention toward the spatial boundaries of lessons.

The Spatial Boundaries

As with the temporal boundaries, the spatial boundaries of violin lessons are becoming through intra-actions. In this second part of the chapter, I explore how the boundaries of the lessons were created by intra-acting doors, walls, and windows; teachers, students, and a cleaner; and music stands, chairs, and all of the other stuff of violin lessons. By tracing their intra-actions, I develop insight into how the spatial boundaries of violin lessons are produced. This insight becomes a part of the investigation of the differential becomings of violinists in Chapter 11.

I start this section by re-turning to the story previously told of the porous boundaries. Told in a slightly different way, the story serves as a starting point for exploring the spatial boundaries of the lessons. Then, I tell the story of the door to the lessons that Astrid taught. Inspired by Ahmed (2017), I explore how the door opened for some of us and not for others, and how it opened into different rooms for different bodies. I end this section with a story of the stickers of violins and how they take part in creating spatial boundaries.

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Porous Boundaries: Version 2

When I arrived at the schoolyard where Marianne taught, it was packed with playing, running, and laughing children. The school day was over, but most of the children under nine years old participated in an after-school leisure program where they played and did activities to support the learning done in the school lessons. Some, like Olivia and Sarah, also took instrumental lessons. I entered through the old, heavy door and found the classroom where I had arranged to meet Marianne.

I found my place in the back of the classroom, started my recorder, and opened my note-book. I could hear the sounds from the school yard through the open window—the laughter, the yelling, the sound of playing basketball, and, occasionally, a loud grown-up voice giving instructions. The outdoor sounds mixed with the sounds from inside the building. I heard a toilet being flushed—a reminder of the school building's old age and its need for renovation—and the steps of people walking past in the corridor.

At the front of the room, where the blackboard and the entrance door were placed, Marianne swiftly moved the assorted tables and chairs to make an open space for the lesson. With confident speed, she opened a foldable music stand and placed it close to her violin case, which rested on a table with the already-tuned violin inside. The nearby cupboard had its doors open, revealing stacks of sheet music and rows of ring binders. Marianne took some of the sheet music out and placed it on the table, ready to hand out to students.

I arranged my audio recorder and my notebook while looking around. The room was packed with things. There was an odd assortment of chairs and tables scattered across the room. The walls were lined with cupboards and shelves that were filled with boxes. Some of them contained craft supplies, others were labeled with "Kurdish school." The room had that feel of a room used by many, but where nobody feels responsible for doing the spring cleaning.

The door to the hallway was open. We were ready for the lesson to start. But there were no students in sight.

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How might I pluck at the strings of this story to explore how the porous spatial boundaries are becoming? The outside sounds that permeated the room provide a starting point. In defining the flushing toilet and playing children as outside of the lesson, I take part in creating boundaries. In insisting on being heard, the children and toilet are contesting these boundaries. Another starting point could be the doors and windows of the room. They were all open, letting in air and sun and sounds. A third starting point could be Marianne and how she arranged the furniture, violin, and music stand into a space for violin lessons within the room. Although Marianne moved the matter with intention, her agency was not the only agency working to create the space for the lessons. The sounds and the assorted stuff of the multipurpose room leaked in. So did the students, eventually, through the open door. But doors are not always open. The first time I arrived at the school where Astrid taught, I came too late to the lesson; the door was closed, and I did not enter.

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The Door to the Lesson: Part 1

When the period of observing Astrid's lessons started, it was winter. Just as I started on the long bus drive across town, the first snowfall of the season, which had arrived surprisingly early, made the traffic slow down. By the time the bus arrived at my stop, I was running late. As I ran toward the classroom, I found the door was closed.

While waiting for the lesson to end, I looked around the corridor. It looked fresh and well kept, with tidy rows of empty pegs for hanging clothes. It was quiet except for the sounds of music spilling out of the closed door. When the cleaner entered the classroom to mop the floors and empty the dustbin, the sound of the playing quartet became louder and then became muffled again as he left, closing the door behind him.

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My interest in the doors related to the violin lessons is inspired by Ahmed's (2017) book *Living a Feminist Life*. Drawing on an article by Frankenberg and Mani (1993), Ahmed brilliantly examines how doors are not as innocent as they look. As I referred to in Chapter 3, when I discussed intersectional feminism, Ahmed writes of how a door might work differently for a brown female scholar entering her university after hours. In one instance, it might be opened by a white male professor who refuses her entry, perceiving her as a stranger to the academy. In another instance, the door might be opened by a Filipina female cleaner who lets the scholar enter without question. Ahmed continues by examining how doors are mechanisms that open and close, letting some pass and not others. But even when the room is entered, Ahmed points out that the room entered is not the same room for everybody. In the example of the cleaner who entered into the classroom where a violin lesson was taking place, he entered the classroom as a room for him to clean and not as a room in which he could participate in a violin lesson[115]—or even be acknowledged as present in. As a white, middle-class woman, I was a more ambiguous presence. When I came back for the second time, this time not running late, Nora questioned my permission to enter through the door while Astrid welcomed me without question.

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The Door to the Lesson: Part 2

I arrived slightly sweaty after almost missing my bus and then getting lost on the way from the bus stop to the school. But I arrived on time. Outside of the science classroom, I made sure both of my recorders had new batteries when Nora arrived. Without looking at me, she knocked on the door.

"Please enter, both of you," Astrid answered. Standing up from my seated position on the floor, I was too slow getting to the door. Nora had already closed it. Did she not remember me from last week? Or did she think that I was here to sit outside the classroom this time as well? Anyhow, I opened the door and entered the room, and Astrid greeted me with a smile.

To the left, the blackboard was filled with writings from the last science lesson. To the right, I saw the sink, a dustbin, and some cupboards full of science equipment. In the middle of the room, there were desks and chairs put together in small groups. Astrid had moved some of them away to create an open space, arranging four chairs and four music stands in a half circle. She had placed herself in front of the quartet's seats with her violin case, computer, sheet music, and purse on a nearby table. A student who was not in the quartet was having a lesson. She was standing right in front of Astrid working on a piece for the annual spring concert.

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115   I re-turn to this event in Chapter 11 when I discuss how lessons are differentially classed.

"Please make yourself ready while we continue working," said Astrid. Without making a sound, Nora found herself a table and put her case on it. I always prefer to have the students facing me when I teach rather than have them looking at the other people in the room. That way, it is easier to keep their attention. Assuming Astrid felt the same, I found myself a place in the right side of the room where the students would have their backs to me.

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Although Nora closed the door on me, I felt the confidence to open it, and I recognized the room as a room for violin lessons while also being recognized by Astrid as a person who was supposed to be there. The cleaner, on the other hand, entered the room but was not recognized as a part of the lesson. For him and to him, the room was a room to be cleaned, not to be played in. The room becoming in intra-action with him was not the same as the room becoming in intra-action with me. For me, this insight is entangled with the insights developed through the diffractive readings of stories from online lessons. The troubling of space and time generated by the COVID-19 virus created other ways of understanding the spatial and temporal boundaries of violin lessons. This, in turn, expanded how I read the following story in which Olivia contested the boundaries of the lessons.

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Missing Stickers: Version 1[116]

Marianne and Sarah were getting ready to play a scale. Marianne, seated in her swiveling chair, let her shoulders fall down with a sigh. Sarah, standing quite closely in front of her, did the same. Marianne's back lengthened. Sarah's back lengthened too.

Although the window was closed, I heard the sounds of children playing outside. It mixed with the sound of Olivia singing as she ate her leftovers from lunch. She was seated at the floor, next to her pink backpack, and held her plastic lunch box in one hand and her slice of bread with cheese in the other. Her eyes followed Sarah as she started playing a D major scale.

"You see. I lost both of them," Sarah said hurriedly, almost before playing the last note of the scale, as she looked apologetically at Marianne.

Olivia, curious to find out what was going on, put down her lunch box with a thud, stood up, and walked over to Sarah.

"You lost your stickers?"[117] Marianne kept her eyes on Sarah as she spoke.

"I lost mine as well," Olivia said with a loud voice.

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116   This story is told in two other versions in Chapter 8.

117   Stickers are sometimes used to mark the place on the fingerboard where the fingers stop the string.

"I opened my violin case, and they were gone," Sarah answered Marianne's question.

Olivia walked to her violin case to get her violin. "Look," she said, holding it up to Marianne, fingerboard facing her. "Do you see that I lost my stickers as well?"

Marianne overheard Olivia. "Well, do you want new ones again, or do you want to play without them?" Her attention was still directed toward Sarah.

"New ones." There was no hesitation in Sarah's voice.

Olivia turned her back to the two others, placed the violin back in its case, and returned to the lunch box and the slice of bread. Seated at the floor, eating, she looked quietly at Sarah and Marianne. First, Marianne took Sarah's violin, and they sang the scale while showing the steps with their hands. Then, Marianne handed the violin back to Sarah.

As she stood up, Olivia took her violin from its case. Following Marianne and Sarah closely with her eyes, she placed her violin under her right arm and her bow at her right index finger. Slowly, she moved to stand closer to Sarah.

"Could you sing on your inside while playing the scale?" Marianne said to Sarah. "If the sound you are making with your violin is the same as the one you are singing—" Interrupting herself, Marianne turned to Olivia and said with a rather stern voice: "Sarah will play first, and then it is your turn." Without waiting for an answer, she turned back. Her voice softened. "Then you know that the pitch is correct. You sing beautifully. Soft and nice shoulders. Could you let your shoulders fall? There you go." Marianne gently touched the left shoulder of Sarah, giving it a slight shake before Sarah placed the violin on it and lowered the bow to the string.

Still standing close to Sarah, Olivia followed her playing of the scale with interest. Slowly, she raised her violin and her bow. When the scale was almost done, she could not help herself. The two last notes became a duet.

"What do you think of that scale?" Marianne asked Sarah.

"It was good."

"It was very good! Well done! You played in tune without stickers!"

"I only have two stickers left." Olivia held her violin up again, and this time it was noticed by Marianne.

"That's right, Olivia," Marianne said, distracted. "Sarah, do you still need me to put on some new ones?"

Smiling, Sarah shook her head.

"Good! I think you can make it without them." Marianne smiled at Sarah.

"Can I take this one off? And this?" Olivia started scratching at the stickers with her nail.

"Oh, you still have them?" After thinking for a moment, Marianne continued. "You know what? Let's wait until they fall off by themselves. I believe they will fall off when you don't need them anymore."

A scream from outside made the three of them look toward the window. "Well done, Sarah!" Marianne's voice drew their attention back to the lesson again. "Olivia, finally, it is your turn to play."

• • •

Initially, when I sat in the classroom watching and taking notes, this event did not catch my attention. It was weeks later, when I transcribed it, merged the field notes with the transcription, and started grappling with how to write stories, that it started to glimmer (MacLure, 2010). At first, what caught my attention was how Marianne and Sarah sang and played and signed the scale. Based on this, I wrote the story named "Missing Stickers: Version 2" that I tell in Chapter 9. Then, I also noticed how the entanglement of Marianne and Sarah excluded Olivia and how Olivia tried to contest the space created by their entanglement. From this observation, I wrote the story you just read. I showed an early version of both stories to Marianne when we met for the second intra-view. She commented that it might look a little harsh the way she ignored Olivia, but that she also considered the ability to wait for one's turn—like Olivia was practicing—and the ability to stay focused while others tried to interrupt – like Sarah was practicing—important to develop. She also added that she was tuning the F sharp Sarah played, a detail that I had not noticed. This became a third story named "Missing Stickers: Version 3" that I also tell in Chapter 9. But for now, I will read the above story diffractively through affect theory and Barad's notion of topological spacetimematter (Barad, 2007), and I will trace the becomings of the spatial boundaries of the lesson.

Topological questions turn our attention to connectivities and relations, not fixed distances (Barad, 2007). Affects are forces and intensities working across and in between bodies—human, nonhuman, and more-than-human—affecting a body's capacity to act (Massumi, 1987). Affect theory brings our attention to the power to affect and to the power to be affected as well as the relationship between these two (Clough, 2007; Dernikos et al., 2020a; Hardt, 2007). What patterns emerge when reading the story through affect theory and the notion of topology? Next, I explore two of these.

The first pattern I explore is that of proximity expressed by imitation. When Marianne sighed and let her shoulders fall down, Sarah did the same. This could be read as the body of Marianne affecting the body of Sarah or as an affect of relaxation moving from Marianne to Sarah. It could also be read as a response to the affects working the other way. It could have been that the affects of being distracted, tense, or unfocused moved from the body of Sarah toward Marianne, and that Marianne attempted to shift these affects into something more useful for learning and playing by sighing and lowering of shoulders. And it could be both, as affects

are both actual contacts in the sense of movements and relations, and virtual in the sense of being an abstract relational realm (Dernikos et al., 2020a). Sarah also imitated Marianne by singing and moving her hands without being told to do so, and it seemed almost as if the movements of Marianne had a direct impact on Sarah. As I will explore in the third version of the story, they actually did.

The second pattern I explore is that of exclusion. The affects working between and with Marianne and Sarah were not extended to include Olivia. Although Olivia tried to take part in the playing of the scale, she was cut off by Marianne. Marianne's voice, shifting from mild to quite harsh in an instant,[118] and her body language of turning away from Olivia both excluded Olivia. This could be read as an example of the way affects work in different ways with and between different bodies and of how this creates different spatial boundaries. Olivia was just as close to Marianne as Sarah was in a geometrical sense. But thinking with a topological notion of space, Sarah was closer to Marianne than Olivia was. Reading the story through affect theory, it becomes tangible how Olivia was in the room—she had entered the door—but was not in the space where the lesson was enacted.

Through the stories told and read in this section, I have explored the spatial boundaries of violin lessons. I have engaged with how the spatial boundaries are discursive, material, and affective, and how the doors to the lessons worked differently for different people. A door can be open or closed, and, when open, it can lead into different rooms. I have also explored how being in the room of a lesson is not always the same as taking part in the lesson. These insights are further developed in Chapter 11 where I engage with the differential becomings of violinists in the intersections of race, gender, and class. I have also explored how the spatiality, as well as the temporality, of lessons could be thought of in terms of topology. In the following and last section of the chapter, I re-turn to the spider of the previous chapter, arguing that we must stay with the topology.

Staying With the Topology

In Chapter 6, we met the spider who entered the lesson of Freya and Linda. Starting from the spider and how it was and was not present in the lessons in a dis/continuous way, I grappled with how the spatial boundaries of the online lessons were multiple and becoming through

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118   I find it important to note that the overall tone of the lessons was highly supportive and friendly, and that it did not seem like Olivia became unsecure or in any way negatively affected by Marianne's comment.

intra-actions. In this final section of the chapter, the spider[119] from the lessons with Freya and Linda returns. In doing so, it reminds us of the entanglement of space and time.

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Playing With a Spider: Part 4

I remembered the lesson with the spider well. I had listened to the recording, I had read the field notes, and I had grappled with the questions they provoked many times. Each time, I felt a tingly sensation of gratitude. I had been in the online meeting room with Linda and Freya and the spider but had not been in the bedroom of Freya's father where the spider could have actually touched me. Not that I have ever touched a spider. I always make sure I keep my distance from them.

One sunny day in the spring of 2022, two years after Freya and the spider had had a violin lesson together, I was thinking and writing about how violin lessons can trouble the idea of being together. Remembering the spider, I sat down to write yet another draft of a story connected to the event. While rereading an earlier draft, my hand reached right and toward the iPad to listen to the recording of the lesson. I saw a sudden movement out of the corner of my right eye that made me turn. A huge spider sat in the corner of the iPad. My blood started pumping. My breath became quick and shallow. I froze, my arm half stretched out, and my eyes locked on the spider.

Sitting completely still, I called my husband to remove the spider. He did so calmly and friendly like he always does. But the dread, the pumping blood and shallow breath, and the heightened awareness of the possibility that there might be other spiders in the room, stayed with me for hours while I worked on the story and the diffractive reading of it. And, thus, the spider in the lesson, the one that I did not feel like I was together with in 2020, became a part of the lesson as I engaged with it in 2022. We were in the lesson together, even if was two years after it originally occurred.

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As the spider entered the space and time where I sat writing this story, it also entered the other stories of the dissertation and their readings. In elevating my heartbeat and making by breath quicker, it entered my body, my way of being in the world, and my way of thinking and writing. Thus, it reminded me that space and time, although useful to separate when

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119   It could be argued that the spider, most likely, is not the same as the one Freya met. But as storytelling goes, it should be the same.

writing such a text as a dissertation chapter, are entangled. The cuts made to separate them are agential cuts cutting together-apart (Barad, 2014).

In the previous chapter, the understanding of space as a container or context; of time as linear, predictable, and progressing; and of matter as pre-existing *in* space and time (Barad, 2007) was contested, and a pattern of troubled togetherness emerged. The insights from that chapter are put to work in the present chapter as I read stories from face-to-face violin lessons through agential realism and affect theory to explore the topological questions of boundary, connectivity, interiority, and exteriority that must supplement and rework geometrical questions of bounded size and shape (Barad, 2007). Throughout these two chapters, I have tried to stay with the trouble caused by the virus and the agential realist understanding of space and time as becoming in topological, not geometrical, ways. In the following interlude, I bring the troubled togetherness and the temporal and spatial topology together in the concept of topological togetherness.

Interlude II: Topological Togetherness

Through the readings of "Chapter 6: COVID-19 Troubling the Space and Time of Violin Lessons," my assumptions of the meaning of being together in lessons were troubled and a new, troubled togetherness appeared. In "Chapter 7: The Topology of Violin Lessons," I have developed insight into the spatial and temporal topology of violin lessons and of how questions of connectivity and relations supplement geometrical questions of fixed distances and bounded forms. Together, these two insights form the concept of *topological togetherness*.

Reading stories from violin lessons and the concept of topological togetherness through one another enables insights into how the agencies of the lessons—the students and spiders; violins and viruses; and doors opening or not opening—are connected in shifting and becoming ways. The spatial and temporal boundaries of the lessons are not pre-existing containers. Rather, they are, like the containers of Le Guin's (1986/2019) essay, becoming with that which they hold. And, like the Sámi concepts of togetherness expressed through oktavuohta and Siida, togetherness in violin lessons is not restricted to humans. It also incorporates land, animals, materials, histories, friendship, and kinship.

The concept of topological togetherness emphasizes how violin lessons are phenomena consisting of intra-action agencies, and how the parts of the phenomena are becoming through agential cuts. The concept offers insight into how time and space are not pre-existing containers (a geometrical notion) but are becoming through intra-actions creating ever-shifting connectivities and relations (a topological notion) and of how we are together, although in troubled ways, in space and time.

This insight enables investigations into "how worlds are made and unmade" that might enable us to "foster some forms of life and not others" (Haraway, 1994, p. 63). The world I hope to participate in fostering is a world where music education is more response-able for how it offers im/possibilities for differential becomings. I develop these thoughts in Chapters 10 where I explore the differential becoming of violinists. In the next two chapters, Chapters 8 and 9, continue the exploration of how violin lessons are enacted by turning to violins and their many strings.

Chapter 8: The Guarneri "del Gesù" 1742 "Alard" Violin by Jacob von der Lippe

In this chapter, I trace the many strings of violins inspired by Osgood and Mohandas's (2021) engagement with animal figurines in a Montessori nursery. Tracing the strings of violins troubles the notion that individual humans and their intentions are the main force behind the enactments of violin lessons. Instead, tentacular stories that explore the entangled agencies of matter and discourse, economic and social structures, traditions and histories, and also the physical phenomena of diffraction, emerge. The insight generated through this tracing is important for the exploration of differential becomings that I do in Chapters 10 and 11.

Barad writes of re-turning "as in turning it over and over again—iteratively intra-acting, re-diffracting, diffracting anew, in the making of new temporalities (spacetimematterings), new diffraction patterns" (Barad, 2014, p. 168). Throughout this chapter, I take my violin, a Guarneri "del Gesù" 1742 "Alard" violin by Jacob von der Lippe, as the starting point, and I re-turn to it to explore its many strings. The first re-turn I make is toward the materials of the violin and how the conditions for violin making are connected to the climate change of the Anthropocene as well as to capitalist and colonial economies.

The second re-turn is a turn toward the three men responsible for the naming of my violin: its maker, Jacob von der Lippe; Bartolomeo Giuseppe Guarneri "del Gesù", the luthier who made the violin that served as a model for my violin; and Jean-Delphin Alard, the violinist who gave the violin its nickname. Starting from these three men, I trace the relationships between teachers and students they are part of. In the exploration of these relationships, some of the gendered structures of Western music education become visible.

The third re-turn to my violin is a re-turn to its strings, to the sound waves created by their oscillations, and how the different waves diffract through one another. Thinking through the phenomena of diffraction, I explore how the musical concepts of dissonance and consonance are diffractive patterns and how these are becoming in intra-actions.

I end this chapter by re-turning to my violin and the hands I play it with, hands that resemble my grandmother's, and how the strings of violin playing can be both resisted against and adhered to.

The Materials of the Violin

Violins belong to a large group of bowed string instruments that probably originates from Asia. The single-stringed Arabian *rebab* is the direct ancestor of the European violin and was brought to Spain by the Moors (Bennett et al., 2018). Although Andrea Amati, who lived in the Italian town Cremona from 1505 to 1577, is said to be the maker of the first-known instrument that closely resembles the modern violin (Bennett et al., 2018), the origins of violins are contested (Boyden et al., 2001). What seems certain is that the Italian town Cremona became the center of violin making at the beginning of the seventeenth century. The Guarneri family, alongside the Stradivari family and the Amati family, created a large number of instruments of superb quality (Beare & Beare, 2001; Boyden et al., 2001; Sackman, 2020b).

A violin is made of more than 70 parts, most of them wooden, and the process of making violins is complex. Thus, it is difficult to pinpoint what makes the old Cremonese instruments so sought after by players. The most common material for the soundboard (sometimes called the belly of the violin) is spruce and the quality, thickness, and shape of this part of the violin is crucial for its sound (Boyden et al., 2001). Some studies claim to have found exceptional qualities in the wood of Guarneri instruments (Su et al., 2021), which might explain why they are considered to have outstanding playability. Other studies argue that the old instruments of Guarneri and Stradivari, when blind tested against new, high-quality instruments, are not preferred (Fritz et al., 2012, 2014). This suggests that the histories and myths of these instruments are part of why they are considered to be excellent instruments.

What is certain is that the spruce that the old Cremonese violins are made of has been affected by seasonal changes. Arranging the fibers in alternating strata creates the grain of wood. The summer growth, when the sap is rising, creates darker strata than the paler winter growth, and the balance between the summer growth and the winter growth is acoustically important (Boyden et al., 2001). What happens to the growth of spruce trees and the possibilities for making future violins in the Anthropocene given the current situation of climate change? Solnit (2022) points to how climate change and rising temperatures will—among the many changes that will come and are already here—change the possibilities for making violins by changing the density of the wood. Capitalism and the exploitation of natural resources, by creating climate change, have brought about these changes to violin making.

Other aspects of the materiality of violins are also connected to global trade and economics as well as the exploitation of natural resources. Ebony, the wood used for the finger board, and pernambuco, which is used for violin bows, are nearly extinct in the wild. There are efforts to find replacement materials (Liu et al., 2020; Wegst et al., 2007), but the underlying issue is

one of exploitation and extraction. While maple and spruce trees are native to the woods of Europe, ebony and pernambuco are native to countries that were colonized by Europeans. Violin makers' access to these materials, and their near extinct status, are direct results of colonial trade. Although an unusual material, the fact that the frog of my bow is made of tortoise shell adds to grim picture of colonial and capitalist exploitation.

By tracing the strings of my violin's and bow's materiality, starting from spruce and the other materials it is made from, the connections between violins and the Anthropocene, climate change, and a colonial and capitalist economy become tangible.[120] By noticing and acknowledging these strings, by being attentive to how violins came and come into being, it might become possible to foster more some forms for lives and not others (Haraway, 1994) and to develop more response-ability in music education. This might also be done by tracing the strings of the relationships between students and teachers or masters and apprentices, and by exploring how these form gendered structures.

The Men of the Violin

My violin is named after three men, and, in the following section, I will trace the strings connecting them to each other and to the students and teachers of the lessons. The tracing of strings makes tangible the gendered structures of violin playing and making.

Jacob von der Lippe

The spruce of my violin is shaped by the hands and tools of its maker, Jacob von der Lippe.[121] Violin makers have learned from studying other makers' violins, and many makers use instruments from renowned violin makers as models when building their own instruments. Von der Lippe used Stradivari and Guarneri models when making violins until he developed his own model. The violin I play was built in 2007 on a Guarneri model. For a trained eye and a trained ear, it is possible to recognize the violin as a von der Lippe violin, and also to distinguish it from the violins he built in the same period but modeled on Stradivari violins.

In addition to being made by von der Lippe, the violin also bears the marks of being played by me. The varnish is worn down at some places more than others, which shows that I teach

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120　See the field of ecomusicology for a further engagement with the intersections of music/sound, culture/society, and nature/environment (Allen, 2012; Allen & Dawe, 2016).

121　Playful photographs of some of the instruments made by von der Lippe can be seen here: https://www.vonderlippe.com/portfolio-items/.

beginners while using a beginner's hold more often than I play advanced pieces. The sound, although I love it, is less developed and mature than it would have been if the instrument had been played by a more skilled violinist. By being played by me, the violin has developed a distinct feel of being my violin. It has my smell, my skin cells covering the chin rest, grooves made by my fingers, and the fingers' residual fat on the fingerboard. Once a year, I bring it back to von der Lippe for him to repair any damage to the varnish and to remove the grooves that have been worn into the fingerboard. Thus, we both take part in the continued becoming of the violin: I wear it down, and von der Lippe rebuilds it.

Just as the violin is marked by me, so too do I bear the marks of the violin. My shoulders and my back are asymmetrical because violin playing is asymmetrical. The fingers of my right hand form the shape of a bow hold even when I hold a toothbrush. The tips of my left-hand fingers are hardened by years of pressing down metal strings. My hearing at certain frequencies is damaged by the repeatedly high sounds my ears have endured, but I am also capable of recognizing when the A string vibrates at exactly 442 Hz—not 441 or 443. I will return to the entanglements of violins and violinists in Chapters 9 and 10. But for now, I turn to the maker of the violin that served as a model for mine: Guarneri "del Gesù."

Bartolomeo Giuseppe Guarneri "del Gesù"

Bartolomeo Giuseppe Guarneri—who later in life adopted the nickname "del Gesù"—was born in Cremona in 1698. He was trained by his father and studied the instruments of Stradivari, also a native of Cremona, and of the Brescian violin makers. Building on these influences, Guarneri made violins that became known for their ease of response—likened to that of Stradivari violins—combined with a strong sound and ability to withstand strong bow pressure, which was borrowed from the Brescian school (Beare & Beare, 2001). The "Alard" violin he made in 1742 is described as having a back plate "in one piece; wide flames, very beautiful, descending slightly to the right," with a very beautiful head and a golden-red varnish (Sackman, 2020a, p. 46). It is now a part of the Musée de la Musique's collection in Paris.[122]

The Guarneri family, like other luthier families of the time, consisted of generations of makers trained by their fathers and uncles (Beare, 2001a, 2001b). Although there are contemporary female luthiers, the male dominance in the trade is still strong.[123] But although not widely recognized, there might have been female violin makers in seventeenth century Italy. In the history of music, it is known that married couples or siblings who worked together presented

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122   The museum's web presentation of the violin, including pictures and a sound sample, can be found here: https://collectionsdumusee.philharmoniedeparis.fr/0157816-violon-le-alard-de-guarnerius-del-gesu.aspx.

123   It is telling that von der Lippe was trained by the first (certified and recognized) female violin maker of Italy, Wanna Zambelli (Colborne, 2018; von der Lippe, n.d.).

the products in the man's name, and some evidence suggests that this might have been the case in the Guarneri workshop where the wife of Guarneri "del Gesù", Katarina Guarneri, most likely worked. The violins bearing the label of Guarneri "del Gesù" have scrolls with varying characteristics, and one possible reason for this could be that they were made by (at least) two different makers, one of them being Katarina Guarneri. Anther trace of hers is found in instruments bearing copies of her label. Although none of her original labels are known, the existence of copies suggests that the instruments bearing her label were considered of such a quality that to make a copy was profitable (Hargrave, 2000; *The Forgotten Female Violin Maker of Cremona*, 2020).

Jean-Delphin Alard

The third male connected to the naming of my violin is its most famous player: Jean-Delphin Alard. There are many myths surrounding old, Italian violins concerning how they were made and how they were traded. According to the story often told, the Italian instrument dealer and collector Luigi Tarisio bought a great deal of these instruments in the first half of the seventeenth century and sold them to violin dealers in Paris. When Tarisio died, one of these dealers—Jean-Baptiste Vuillaume, the father-in-law of Alard—managed to secure Tarisio's collection (Sackman, 2020b). Vuillaume gifted one of the violins from the collection, the 1742 Guarneri "del Gesù" violin, to his son-in-law. Alard was an influential violinist and violin teacher in the modern French school of violin playing as a professor at the Paris Conservatoire for 32 years (Schwarz & Newark, 2001). In May 1889, after Alard's death, the violin was gifted to the Musée de la Musique by Alard's daughters (Sackman, 2020a).

As the violin I play is modeled on the Guarneri violin down to the finest details, my contemporary violin is, in a sense, produced by the tools and hands of Guarneri and their doings as they were in 1742. As I explored above, the player of a violin also shapes it. Thus, in a way, my violin is also shaped by Alard, and it is connected to the modern French school of violin playing that was centered around the Paris Conservatoire where Alard taught. These strings of connections also stretch in various ways to the lessons I tell stories from. Kreutzer and Bériot, whose compositions Freya played at the lessons, also belonged to the French school (Schueneman, 2004). This school was, and continues to be, highly influential, and it has produced many excellent violinists. Male violinists.

Until the 1890s, women were not allowed to play in the principal Parisian orchestras due to the hard work required of an orchestra musician, but chamber music and, to a certain extent, solo playing were considered appropriate for women (Pasler, 2015). The three solfège classes for male instrumentalists and the five classes for female instrumentalists at the Paris

Conservatoire in 1878 suggest that more women than men would become instrumental performers although their training differed. Female students were directed toward playing repertoire considered appropriate for their gender—avoiding a large dynamic and emotional range—and toward teaching (Pasler, 2015).

I have been able to trace three female students of Alard. By tracing the lives and careers of these three students, it is possible to learn something of the gendered structures of violin playing at the time. One of Alard's students was Marie Tayau. In 1867, at the age of 12, she graduated from the Paris Conservatoire after studying with Alard. Alongside success as a soloist and chamber musician, she premiered several works by famous composers such as Tchaikovsky and Fauré, and she supported the advance of other female musicians by forming an all-female string quartet. The last years before her death at the early age of 37, she quit performing and devoted herself to teaching (Hoffmann, 2009; Pasler, 2015). Another of Alard's students Marguerite Pommereul had a promising career before she stopped performing to marry at the age of 19 (Hoffmann, 2011). A third promising Alard student Marie-Charlotte Boulay graduated from the Paris Conservatoire at the age of 14 and played a number of concerts with Alard. She died in 1872 at the age of 26. When she played her last concert the same year, it was under the name of Mme Claude, presumably after a marriage (Hoffmann, 2011).

These three violinists were the only female Alard students that I could find in the literature searches I did. I assume there were many more considering Alard's 32 years, from 1843 to 1875, as a professor at the Paris conservatoire (Schwarz & Newark, 2001) as well as the fact that there were more female instrumental students than male in 1878 (Pasler, 2015). Where did they go to? Many of them might have become teachers of performers not well known enough to be mentioned in the literature by lack of talent or practice.[124] But it might be more than a coincidence that the three female students I was able to trace share similar stories of exhibiting an early and great talent, partaking in intensive practice and education, and of ending their short-lived careers with death or marriage. I find it likely that the gendered structures of music education and the possibilities and impossibilities of becoming a professional female musician, as well as the health risks connected to childbirth, took part in creating this pattern of promising, but short-lived, musical careers.[125] But although the female students of Alard seem to have had brief careers, many of his male students and colleagues are connected to my violin and to the lessons I tell stories from.

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124   To unpack the notion of talent and its relation to practice is beyond the scope of this dissertation. See Stabell (2018) for an entry point into this debate in relation to the SMPA context.

125   Without likening my life to the life of female violinists in seventeenth century Paris—neither when it comes to discrimination nor talent—I notice that my life and my career have become what they are in intra-action with my gender and my childbearing body, the gendered structures of the society, my talent (or lack thereof), and my training. I will pick up on these strings in Chapters 10 and 11 when I discuss the differential becoming of violinists.

Drawing on half-remembered stories and bits of information from my days as a violin student, I follow the strings made possible by the collective of Wikipedia and the algorithms of Google to learn that Alard's father-in-law, the luthier and violin dealer Vuillaume, made the violin played by one of my former teachers. Thus, I have listened to and spent time with a Vuillaume violin, playing with it on my von der Lippe violin, for countless hours. Continuing my search for strings, I learn that Bériot, the composer of the violin concerto played by Freya, also played a Guarneri "del Gesù" violin (Rattray, 2015). I also learn that Bériot's most famous pupil was Henry Vieuxtemps (Schwarz, 2001), who, in turn, taught Eugène Ysaÿe (Schwarz & Hibberd, 2001) who taught Aldo Ferraresi ("Aldo Ferraresi," 2022). Ferraresi was the teacher of one of Linda's teachers. Thus, there is a direct string of teachers and students from Bériot to Freya.

The connection from Bériot to Freya also materializes in the sheet music she played from. When she played Violin Concerto No. 9, op. 104 by Charles-Auguste de Bériot, she read from a copy of a copy of the original publication, which contained generations of annotations from students and teachers.[126] Before the lesson, Linda scanned the three pages of the first movement and sent them to Freya and me by e-mail. We each printed the files, so the three of us had the sheet music to look at during the lesson. The ink markings that appear on the paper are the symbols that Bériot chose in order to notate his idea of the composition he was making; the other ink markings are the revisions made by the editor, A. Pollitzer. After reading my printed copy of the scanned sheet music, I turned to Grove Music Online and learned that Adolf Pollitzer was a student of Alard (another string!) (Horner, 2001). But there are also the annotations of students and teachers, and the scanners and printers involved in transferring these to the homes of Freya and me might have left their traces as well. Thus, the sheet music is materializing the string connecting Freya to Bériot and to a network of violin students, teachers, and players.

In this section, I have traced the strings connecting my violin to the three men responsible for the naming of it, and to the traditions and histories of violin playing and making. Tracing these strings has made tangible the gendered structures of violin playing and their connection to the lesson I tell stories from. This insight will be put to use when exploring the differential becomings of violinists in Chapters 10 and 11. In the following section, I turn to the material strings of the violin and explore how a violin's sound is connected to the physical phenomena of diffraction.

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126   A copy of the sheet music can be seen in Appendix 10.

The Strings of the Violin

When the string of a violin is played by a bow, the bowing elicits a self-sustained oscillation through the slip-stick action of friction between the bow-hair and the string" (Woodhouse, 2015, p. 2). In other words, the hairs of the bow—hairs cut from a horse's tail—and the rosin that makes them sticky make the string move by gripping and slipping. The self-sustained oscillation is a complex process with many possibilities for manipulating the sound after the initial onset, and the instrument has a broad range of musical expressions within a wide variety of repertoires and genres. The four strings of a violin can play all of the chromatic semitones, even microtones, over a range of four octaves (Boyden et al., 2001; Woodhouse, 2015). This rather technical explanation of how violins produce sound is complemented by turning to a specific violin and exploring how I experience its entanglement of sound and shape and sensation.

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A Brick Red Violin

The violin's varnish is a warm red color with yellow undertones. The texture and pattern of the Italian Alpine Spruce on the top and the flamed maple of the back shows through the varnish, making the violin look almost alive. To me, its shape looks sturdy, almost a bit square. The look of the violin matches its warm and rich, but not slick, timbre. There is a texture, a resistance, in the sound that intrigues me. In a way, the violin reminds me of a brick wall. Warm, red, strong, and slightly rough.

Before deciding to buy a brand-new violin, I had been warned about how a violin needs to be played for a while before the sound opens up and becomes rounder and more pleasant. Nevertheless, I was taken aback by the harshness of the violin when I first played it. But as it was played, the violin changed. Or maybe the violin changed me and my way of playing. Or we changed together, the violin shaping me and me shaping the violin. The sound we made slowly became more rounded, more balanced, and more open. The pitches corresponding to the open strings became easier to find as the sound opened up, becoming brighter and more glimmering while also becoming deeper and fuller.

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By this dual introduction of vibrating violin strings, I want to emphasize how the physical phenomena creating sound waves are intimately connected to the affective and bodily experiences of sound. The intimate, physical, and felt relationship between a violinist and a violin,

exemplified by this engagement with vibrating strings, is a part of me and of the research apparatus, and it has shaped how I engage with diffraction as a research practice. In this section, I hope to make it possible for even a non-violinist reader to comprehend some of my engagement with diffracting sound waves and vibrating strings. This insight will, in particular, inform the stories in the following chapter that center the specific violins of the lessons and their strings. As a point of departure for exploring the strings of violins, I use a quote from Barad. After naming a number of perspectives on the nature of apparatuses, they write:

> Reverberating at different frequencies, these differing lines of thought can productively be read through one another for the patterns of resonance and dissonance that illuminate new possibilities for understanding and for being. (Barad, 2007, p. 142)

Barad imagines lines of thought to reverberate at different frequencies, and that they, when read through one another, create patterns of resonance and dissonance. Although a powerful metaphor for diffractive readings, Barad's words could also be read as a description of the material practice of violin playing and of reverberating strings, and, in the following, I will expand on this topic. I start by discussing the physics of violins and how the frequencies of the strings are transferred to air, creating sound waves. Then, I turn to how the string is vibrating not only along its whole length but also along its parts. Thus, the string is creating a multiple of waves at different frequencies which, in turn, diffract through each other, through the frequencies of the materials of the violin, and through the violin's surroundings.

The tailpiece of a violin is secured by the tailgut that runs over the ebony saddle and is looped over the end pin. The four strings are anchored in the tailpiece, strung over the bridge, carried over and above the fingerboard, strung over the nut, and secured in the pegs of the pegbox. Inside the violin, a soundpost stands vertically between the back and the belly, and a bass bar is glued to the undersurface of the belly. These provide the interior of the violin with support to withstand the pressure of the strings, and they enhance the quality of sound. The oscillating movements of the strings are transferred to the violin body through the bridge, the soundpost, and the bass bar (Boyden et al., 2001).

The wood of each individual violin has resonance frequencies created by the shape and thickness of the wood as well as its density and structure—created, by among other agencies, the climate in which the wood was grown. As the oscillating string sets the wood in motion, these frequencies take part in creating the timbre as well as the resonance frequencies of the other not-played strings of the violin (Boyden et al., 2001; Woodhouse, 2015). When the resonance frequencies of the wood change, for example, by changes in the humidity due to cold weather, they change the timbre of the violin. These changes might be very subtle, and

they are intimately connected to the specific instrument. I cannot claim to be able to tell the humidity of any violin's wood, but when playing my specific violin—the one I have played for years through changing seasons—the sound produced is as reliable as the hygrometer[127] in my case, in alerting me to when it is time to use an air humidifier.

A string vibrates with its whole length to create the fundamental,[128] the sound we perceive as the pitch. But the string also vibrates in various parts of its length. These frequencies are related by simple whole number ratios to the fundamental and are called harmonics (Oldham et al., 2001). The timbre of the tone is affected by the relationship between the vibrating string—both the fundamental pitch frequency and the upper harmonics—and how these vibrations are received and transmitted by the violin's body as it amplifies and projects the string vibrations to the outer air (Boyden et al., 2001).

The resonance frequencies and their part in creating the timbre of the tone also account for why I, if playing on the A string, will feel or know or hear—I am not sure what word to use—if one of the other strings of my violin is not tuned. The resonance frequencies are also in play when I might tune a note stopped by a finger, for example a D played on the A string with my third finger, to the corresponding open string without touching the open string. I tune the pitch by listening to or feeling the vibrations of the open string as they correspond to the string played. If the pitch played is one octave lower than the open string, it is also possible to see the open string's vibrations. When the vibrations are too small to be seen, they are heard as a bright, glimmering quality in the timbre and felt as a sensation of openness and being at ease. The same sensation of glimmer was created when I first read Barad's agential realism. Their writing and my way of being in the world resonated in ways that illuminated "new possibilities for understanding and for being" (Barad, 2007, p. 142).

Playing With Response-Ability

In conventional, humanist terms, the process of playing and adjusting the way one plays can be described as a feedback loop through which the player adjusts the details of their playing as they listen to the sound they produce (Woodhouse, 2015). In terms of agential realism, the phenomena of violin playing are constituted by the player and the violin and the bow and the strings and the rosin and the acoustics and the air humidity and a myriad of other agencies intra-acting and taking part in an ongoing materialization of sound waves. To play, then, becomes to be in a state of response-ability. The player responds to these shifting intra-actions, takes part in them, and answers to what they produce.

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127   An instrument used to measure the amount of water vapor in the air.

128   Also called the first harmonic.

One of the things produced are the diffractive patterns that result when waves meet. In music, these patterns are often described as consonances and dissonances. Consonances occur when the combining waves create simple patterns, such as when the ratio is 1:2 or 2:3. In this case, the emerging diffractive pattern rapidly repeats itself, and the combined sound is perceived as pleasant (Palisca & Moore, 2001). Dissonance is described as the antonym to consonance; two or more notes that are perceived to have a roughness or tension when sounding together ("Dissonance," 2001). This tension comes from the complexity of the diffractive pattern and the relatively long intervals between its repetitions (Palisca & Moore, 2001).

When stopping the string with the finger to produce different pitches, great accuracy is required. One way of training this ability is for the student to play with the teacher. When the student's pitch matches the teachers', a diffraction pattern of consonance is produced. However, if the pitches do not match, a dissonance is produced. Aids, such as stickers that show students where to place their fingers, are widely inaccurate; only by attentive listening can playing in tune with another violin be possible, or, as in the case of Sarah playing the D major scale, in tune with one's inner conception of pitch.[129]

Re-turning to the quote from Barad, their figuration of differing lines of thought that create patterns of resonance and dissonance materializes differently when read through the material practice of playing the violin and intra-acting with sound waves. In addition to being a figuration that informs how I think different concepts through one another, dissonances and consonances take on a material form, and they are part of my daily musical practice.

In the last re-turn to my violin in this chapter, I bring the vibrating strings, the gendered structures of Western classical music, and the strings connecting violins to the Anthropocene together in a story of playing with my grandmother's hands.

Resisting the Strings of Violin Playing

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Playing the Violin With my Grandmother's Hands

"When practicing, my grandmother is with me," I wrote in my research diary one Monday in February 2021 after practicing the piece by Bériot. "I have her hands. Our pinky is weak,

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129   This insight is useful when reading the story called "Missing Stickers: Version 2" in Chapter 9.

short, and the third joint is totally useless. I can't straighten it, and I can't lock it regardless of how much I practice. My grandmother played the guitar and the organ. I wonder if our pinky bothered her?"

I stopped writing to look at my hands. They looked older than I remembered them looking. They appeared more like my grandmother's hands did when she was alive. I let the hands return to the keyboard.

"In the sheet music of Bériot," I continued writing, "numbers indicate which finger to use when stopping the string. There are some printed fingerings, most likely added by the editor Pollitzer. There are also some fingerings written with a pencil in the sheet music later scanned and sent to me. Some of the markings are stronger than others, and I wonder how many layers of copies and added fingerings there are in the sheet of paper placed at my music stand. Although I first intended to play with the fingerings in the music, our pinky resists. It can't do vibrato on the long notes, and it is not comfortable being the first finger placed down after a long shift upwards. My grandmother and I are resisting the fingerings of men with stronger pinkies. I will add my own fingerings in pencil."

Feeling a willful joy, I turned to the sheet music to change its fingerings.

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My resistance against the strings of violin playing, my willfulness (Ahmed, 2017), comes from a place of power. I am no longer a student. When I practiced sixteenth notes in that Berlin flat accompanied by shouts of "Good girl!", I wanted to be found worthy of entering the violin playing tradition. Now, I am older. I have a steady income. I have given up some dreams and found some others. The strings of violin playing, the traditions, norms, and standards, no longer have the same strength when pulling me. But I still recognize them and their power. I also recognize how the strings of my violin, the Guarneri "del Gesù" 1742 "Alard" violin by Jacob von der Lippe, come to life through my engagement with them and how I come into being by them engaging with me. Only when I am playing is my pinky too weak and too short. In all other situations, it is perfectly adequate.

A feeling of gratitude exists along with my resistance toward the strings of violin playing. A gratitude for belonging to something that, despite its connections to classist, sexist, and gendered structures, also holds so many glimmers of beauty. In Sámi culture, being joiked by or by joiking someone—a human or an animal—or somewhere creates communities among humans, animals, places, and spirits (Hirvonen, 2010). When I play, I feel like I take part in the creation of a community.

In this chapter, I have traced this community starting from my violin and exploring its connections to the material it is made of, the men who played a part in naming it, the vibrations of its strings, and my resistance against the strings of violin playing. Through this exploration, tentacular stories of entangled agencies have emerged. These stories include matter and discourse, economic and social structures, traditions and histories, and the physical phenomena of diffraction. The insight developed through this exploration will be put to use when exploring the differential becomings of violinists in Chapters 10 and 11. But before I do that, I turn to the specific violins of the violin lessons.

Chapter 9: The Violins of Violin Lessons

In this chapter, I expand on the understanding of violins as tentacular—connected to a myriad of other agencies through strings—that emerged in the previous chapter by exploring the agency of the specific violins used in the violin lessons. I start by reading Marianne's statements about how touching a violin is part of what makes playing music valuable to students through Barad's work on the nature of touch. Through this exploration, the entanglements of matter, discourse, and affect are made tangible. Then, I turn to the Sámi concept of *duodji,* a knowledge system and a practice of creating material objects. By reading a story concerning how different violins play differently through duodji, new possibilities emerge for how to explore "the particularities of the entanglements at hand" (Barad, 2007, p. 74) or for understanding how the material speaks and leads the way (Finbog, 2020). In the third part of the text, I re-turn to the story of the missing stickers. This time, I tell the story through the agential realist notion of agency as not aligned with human intentionality. Using the insights from the readings of touch and of how the material speaks, I explore how the intra-acting agencies of the lessons co-constitute the learning, teaching, and playing that is done.

Touching Violins

In their essay "On Touching—The Inhuman That Therefore I Am," Barad (2012) writes that touch is, in an important sense, the primary concern of physics. "Its entire history can be understood as a struggle to articulate what touch entails" (p. 208). To touch is to meet, to be in contact, and to intra-act, and touch is an important part of violin lessons. In Chapter 10, I tell a story of how Astrid, the teacher, shaped the body of the student Nora by touching and moving it. In this section, I start with the violin and explore how violin works when touching and being touched.

Barad, paraphrasing Haraway's writing about touching her dog, asks, "Whom and what do we touch when we touch electrons?" (Barad, 2012, p. 215). Paraphrasing yet again, Barad decenters the "us" and turns our attention to electrons. "When electrons meet each other 'halfway,' when they intra-act with one another, when they touch one another, whom or what do they touch?" (p. 215). Touching is connected to response-ability. "*Touching is a matter of response. Each of 'us' is constituted in response-ability. Each of 'us' is constituted as responsible for the other, as the other*" (p. 215, emphasis in the original). How might these thoughts on touch relate to violins and violin lessons? In Chapter 8, I wrote about how I am shaped by my violin, and the violin is shaped by me as a result of our continuous touching. I also suggested

how playing is an act of constant response-ability through which the player responds to the shifting intra-actions of the many human and nonhuman agencies of the phenomena of violin playing. I now re-turn to the question of touching violins by reading a part of an intra-view with Marianne through Barad's work on touch.

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Feeling the Wood

During our intra-view, Marianne talked about how she tried her best to get the students to practice in between lessons. She told me about how she found it hard to motivate the students to practice, but when they did it, they often found more joy in playing because they were learning quicker. Recognizing the struggle, I asked Marianne why she thought her students should bother playing the violin at all.

"Yeah, why should they learn to play the violin?" Marianne paused to think.

"The intrinsic value of music is great, that alone is a good reason to play," she continued. "To make music, by yourself, and to be able to share your music with others. That is a great thing to be able to do." She moved on to the transfer effects, recognizing how they could be used to legitimize music projects like the ones she was teaching in. Then she stopped to think again.

"And there is something I have been thinking about a lot. The thing is, to play is a tactile experience. It is something you feel. The violin has a shape and a weight. It is material. It is a different experience than many of the everyday experiences of the children."

"Yes," I said, nodding. "To have a nice violin case with a real instrument—"

"Exactly!" Marianne agreed. "The violin is made by wood, and they hold it feeling the wood. You know, feeling that distinct feeling from that particular instrument. I have thought of this even more after noticing how similar everything feels when using a computer keyboard. I keep in touch with family and friends, I read the news, I work, I am entertained, and all this feels the same. It feels of keyboard. To touch something different feels liberating. I would like the students to experience that feeling."

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As Marianne spoke of touching violins, of feeling the wood, she emphasized the affective aspects of touch: how the violin moves the violinist by its weight and shape and the material of wood, and how a particular violin creates a distinct feeling. She described the affects as moving between the violin and the violinist and connected them to the materiality of the violin, and she felt them as her arms moved with an imagined violin. I added another aspect by mentioning how the violin is a real instrument, thinking of the many times I have noticed

how otherwise quite reckless children are able to take good care of their expensive instruments. Marianne's (and my) thoughts on touch are articulated from a violin teacher perspective, while Barad's thoughts come from a feminist and quantum physics perspective. Reading the intra-view and Barad's (2012) essay thoughts diffractively through one another, I notice a shared interest, creating consonances, in the way we conceptualize touch as incorporating many entanglements. Barad explores "the physics of touch in its physicality, its virtuality, its affectivity, its e-motion-ality, whereby all pretense of being able to separate out the affective from the scientific dimensions of touching falls away" (pp. 208–209). Touching is also about meeting.

> And if the two hands belong to one person, might this not enliven an uncanny sense of the otherness of the self, a literal holding oneself at a distance in the sensation of contact, the greeting of the stranger within? (Barad, 2012, p. 206)

What if touch is not between two hands, but between a hand and a violin. Could it be that to touch a violin is akin to touching the stranger within each of us? This could be a way of articulating the value Marianne finds in touching violins. What she describes as a liberating feeling, I might also describe as a feeling of relief, a feeling of achieving contact with the violin and, thinking through the words of Barad, with oneself. But then, what differentiates touching a violin and a keyboard? Why is touching a keyboard not a feeling that Marianne considers valuable?

A particular violin has a particular feel to it. This particularity was explored in the previous chapter in which I traced the strings of my violin, and it is alluded to by Marianne in the conversation above. Violins are not interchangeable, and a familiar violin is familiar while a strange violin is strange. Through the intra-actions with the player, through being shaped by and shaping each other, the violin and the violin player become familiar to each other. But why should this not also be true for keyboards?

I could approach this question from a realist perspective by saying that each keyboard has its own inherent characteristics, maybe a slight slowness in particular keys, that is there for me to notice. By noticing this, the keyboard becomes a specific keyboard. Or I could take a constructionist perspective: Each keyboard is constructed differently through social and cultural interaction. Then, the keyboard becomes what I construct it to be. Or, like I would prefer to do, I could think from an agential realism perspective. Then, the keyboard—as the violin does—is becoming through intra-actions. It is these intra-actions that bring the particular keyboard into its particular existence. Thus, there is no inherent distinction between touching violins and touching keyboards, and there might very well be keyboards and humans who intra-act in

ways that make a particular keyboard have a distinct feel for that particular human. I imagine esports players might have this experience. But Marianne and her students—and me—do not take part in those intra-actions with keyboards. We touch violins in their physicality, virtuality, affectivity, and e-motion-ality (Barad, 2012). We respond, we are response-able, we become in ways that make us notice slight changes in the wood's humidity or in the tuning of the strings, and that creates a distinct feeling from that particular instrument.

In the previous chapter, I referred to research that turned to the physics of the materials of the violins in a search for explanations as to why old Italian instruments are considered to be highly playable (Su et al., 2021). This interest in the physical properties of violins suggests an understanding of violins as pre-existing objects with inherent traits—a realist perspective. But the traditions of violin playing—such as naming violins after their players—and my experience of the mutual changes of me and a newly built violin suggest that violins are also considered to be becoming and changing through material, discursive, and affective intra-actions.

When exploring the physicality, virtuality, affectivity, and e-motion-ality of touch, Barad writes that "all pretense of being able to separate out the affective from the scientific dimensions of touching falls away" (Barad, 2012, p. 209). From this, I take that Barad thinks from a place where the different aspects and meanings of touch are told through entangled tales, each "diffractively threaded through and enfolded in the other" (p. 207). Thus, it makes no sense to separate the affective nature of touching from the physical reality. The affective dimensions of touching violins—their feel, their beauty, their familiarity—and their scientific dimensions—their wood and their weight—are entangled, making specific violins non-interchangeable. This has consequences for how violins work. One cannot assume that one violin works in the same way as another. What is possible to play on a particular violin (or with a particular bow as the story opening this dissertation showed) might not be possible, or at least might be more difficult, to play using another. In the following section, I turn to the Sámi practice of duodji to explore how to be response-able to what the material tells us.

Speaking Violins

As a part of the forced assimilation of the Sámi people, the musical instruments of the Sámi were banned and, to a large degree, destroyed (Finbog, 2020; Porsanger, 2010). Thus, there is only a small amount of literature on Sámi instrumental practices available to me. What is available to me is literature on the Sámi practice of *duodji*. Duodji has been translated as "craft," but Finbog (2020) argues that it is much more than that; it is a Sámi system of knowledge that

is part of processes of developing identities and sovereignty. I find violin playing to also be a system of knowledge, an entanglement of knowing and doing, and I develop this notion into the concept of knots of knowing-in-playing in Chapter 12. For now, I present the practice of duodji and, in particular, its interest in material agency. Then, I tell a story of how a particular violin works. By reading the Sámi concept of duodji through the story, patterns of agentic matter and of entangled knowledges emerge.

When practicing duodji, the person doing duodji is never alone. The voice of the material as well as the voices of other practitioners are always part of the practice; they are remembered and listened to (Finbog, 2020). This resonates with the strings of violin playing that I traced in the previous chapter when I discussed how generations of students and teachers materialize in annotated sheet music. It also resonates with how violins and violin players are entangled, and with how the frequencies of the wood of the violin take part in creating the timbre of the sound. In the lessons I observed, the voices of previous violin players were heard. In the story called "Playing With Bériot" that I tell in Chapter 10, this voice is embodied by the image of a violin professor sitting in the corner, listening and commenting. In this section, I turn to how the material of the lessons, in this case Olivia's violin, also speaks. Or, rather, how it does not as Olivia has trouble making a plucked string sound.

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Listening for a Pling

Marianne, Olivia, and Sarah started to play a tune that I didn't catch the name of. But I could see that the sheet music was a partiture, a full musical score showing all the parts of the composition. Thus, the students' eyes had to jump from the end of the upper stave[130] of the first system[131] until the beginning of the second system without losing the beat. As this caused some trouble, Marianne asked Oliva and Sarah to lower their violins before she talked them through the sheet music, showing how their eyes should move to read it.

  "And now," Marianne said, "let's try playing it. We'll—"

  "Is that the pling?" Olivia interrupted and pointed with her bow to the sheet music.

  "Play the first system first," Marianne continued. "Yes, that cross over the E is the pling[132]." Marianne pointed to the third system. "Do you want to practice that first? It's like this. Three," she stroked the E string stopping it with the third finger, "and then, you drag the string like this," she moved the finger sideways making a pling, "with your third finger."

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130 A stave is the five horizontal lines of musical notation.

131 Two or more staves joined together form a system.

132 The "pling" in question was an E played with a left hand pizzicato (plucked by the fingers of the left hand).

Before the demonstration had ended, Sarah and Olivia started trying for themselves. They did their best, but the coordination needed to first press down the third finger while stroking with the bow, and then to drag the fingers sideways while lifting the bow allowing the string to ring, was too difficult for them.

"No!" Olivia looked angrily at her violin and tried again. This time, the bow landed on the A string.

"Play on the E string. Try again," Marianne said encouragingly.

Olivia tried again. Sarah, who had mastered the technique after some tries, continued to practice it. Olivia found it difficult. Very difficult.

"But, but, but," she stammered in frustration after giving it several tries, "the pling never comes."

"Let me try," Marianne took her violin and bow. She played the part with the left hand pizzicato quickly, to make sure it was possible to do, and then played again slowly while explaining what she did. "And lift the bow. There you go. You try."

Olivia eagerly took the violin and bow back. On the second try, the pling came.

• • •

Patterns of multiple knowledges appear when reading the story told above through the concept of duodji. Duodji is both the name of a practice and of the objects produced through the practice (Finbog, 2020). Thus, to know how to do duodji, one cannot separate doing duodji and the productions of duodji. Through the practice and its products, identities and knowledges are becoming. These are not individual. A person never does duodji alone; it is done in entanglement with the materials, the histories, the places, and the other practitioners (Finbog, 2020). The practices and objects of duodji carry with them knowledges of the past, of relationships, crafting skills, and aesthetic sense (G. Guttorm, 2015).

In observing this event and in crafting it into a story, I make assumptions about Marianne's motive based on my professional knowledge as a violin teacher and my immersion in the system of knowledge of which I tell stories of. I assume that she tested the pling on Olivia's violin instead of demonstrating the technique on her own instrument because of the particularities of violins. I assume that Marianne considered the possibility that the bridge or the nut—or maybe both—were too low, which would have placed the string too close to the fingerboard for Olivia to be able to pluck it. The margins between a too-high string and a too-low string are minute, especially for violins of smaller sizes, and a violin that was fitted perfectly in a climate that was warmer and more humid than Norway's might have strings that are too low after spending a winter in Norway. The chances of this being the problem are quite high when a student is not able to play left hand pizzicato. To know this about how violins work is part

of the professional knowledge of violin teachers, and to listen to the violin, both literally and as a metaphor, is part of the practice of violin playing and teaching.

The knowledge Marianne enacted is connected to touch. For Marianne to find out if the strings were too low, she had to touch the violin. The distance between the strings and the fingerboard could not be measured in millimeters or in the degrees of the angle. It could only be measured by the touch and in the doing of the pling. To touch is to measure.

I also assume, when writing the story and reading it, that Marianne deliberately played the pling twice. First, to measure the violin and its strings and, second, to demonstrate the technique to Olivia. Why didn't Marianne demonstrate on her own instrument? Again, I use my own violin teacher knowledge to make Marianne's knowledge intelligible. Through re-turning to violins and their entanglements, I have tried to make tangible how violins are not pre-existing objects. They are becoming in intra-actions. By playing on Olivia's violin, Marianne did not only demonstrate a technique in a generalized sense. She demonstrated that that particular violin could take part in intra-actions producing that particular sound. To touch is to take part in that particular violin's becoming of a violin that might play pling.

When not touching the violin, but intra-acting with it at a distance, Olivia encounters changing possibilities for analyzing or understanding the movements involved in producing the pling. From experience, I know that many children would rather try themselves than be explained to, and I sense that Olivia, in this particular situation, would have preferred to continue trying rather than wait for Marianne's explanation. By taking Olivia's violin, Marianne forces Olivia to turn her attention toward the demonstration. Touching the violin, but not allowing Olivia to touch it, becomes an act of power. To touch is to exercise power.

A fourth way that touching the violin worked in this situation was by taking some of the pressure to succeed off of Oliva's shoulders. By taking the violin and testing its ability to play the pling, Marianne signaled that the violin was suspect number one when something went wrong. On another occasion, she blamed a weak sound on lack of rosin on the bow hairs and made a little show out of applying more. She also discreetly corrected the bow hold of the student and took some deep breaths that the student mimicked. The sound improved thanks to the rosin but also to the improved bow hold and the relaxed arm. To touch is to exercise compassion.

These multiple ways of touching were done without Marianne commenting or explaining them, and I did not think of asking about them. The way touch works is part of the system of knowledge that both Marianne and I are part of. In being part of a shared knowledge system, we also share in listening to the voice of the violin, using the phrase from Finbog (2020).

By reading Finbog's (2020) work on and with duodji through stories from violin lessons, I have gained insight into how artistic practices might be conceptualized as systems of knowledge, and into how this knowledge is enacted in entanglements with discourses, matter, and affects. In the following section, I continue the exploration of the agency of violins, how they work and the work they do, by re-turning to the story of the missing stickers that I also told in Chapter 7.

Agentic Violins

Agency, in an agential realist account, is not restricted to humans. Nor is it aligned with intentionality. "Agency is a matter of intra-acting; it is an enactment not something that someone or something has. Agency cannot be designated as an attribute of subjects of objects (as they do not pre-exist as such)" (Barad, 2007, p. 214). Rather than being a trait or attribute, agency is a doing and to do agency is to take part in the iterative changes of particular practices. Embedded in the question of how violin lessons are enacted—the first part of the question I initially aimed to answer—is an assumption about agency as executed by someone. I tried to avoid anthropocentric assumptions by not asking *who* enacts violin lessons, but the idea that agency is a trait still lingered. In the following section, I tell a story of how missing stickers did agency, and I read it through the agential realist notion of agency. By doing so, I move away from the concept of agency as a trait and toward an understanding of agency that incorporates the performative perspectives of the concept.

Before telling the story, I will note that this is the second time I tell this story. In the first version, told in Chapter 7, I told the story by thinking through the concept of spatial boundaries and how they are becoming through intra-actions. Thus, the story centered on how Olivia was in the room while being excluded from the lesson. This time, I tell the story by thinking through agency, and the story becomes something else. This is a reminder of how theories in themselves are doing agency.

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Missing Stickers: Version 2, Part 1

One lesson, the colored, round stickers often used to mark the placement of fingers on the fingerboard, made their entrance. I had been sitting in on the lessons of Marianne, Sarah, and Olivia for a couple of weeks, and I had learned to expect Marianne to start the lessons by paying attention to the bodies of the students. She noticed how they placed their feet,

sometimes moving the feet further apart or reminding the students to put equal body weight on both feet, and she often asked the students to lengthen their spines. In this lesson, she laid her hands on the shoulders of Sarah, relaxing the weight of her arms into Sarah's body while gently shaking her shoulders. When satisfied with a student's posture, Marianne often moved on to a specific technical aspect. This lesson, she focused on the left arm and how it moved when changing from one string to another.

"Imagine that your arm is a hammock," Marianne said and gently moved Sarah's left arm from side to side under the violin. Sarah's left arm moved freely and softly from side to side.

"A hammock with a sleeping baby in it?" Sarah looked like she would like there to be a baby. A cute, little sleeping baby. She continued to rock her arm back and forth. Then she stopped, suddenly remembering something.

"Will I get a sticker? Right there?" She pointed to the finger board of her violin.

"That's right. I did promise you a new sticker." Marianne stood up and moved toward the cupboard where she kept all of her stuff.

"What sticker? Can I have a look?" Olivia had been seated by a table waiting for her turn, but now she moved closer.

"The second finger on A," Sarah explained. Her violin's fingerboard had round stickers showing the placement of her fingers, but one of them was missing.

Both girls gathered around Marianne as she took Sarah's violin and played some notes with her thumb, holding the violin like a guitar, to find the correct placement of the sticker.

"How did you do that?" said Olivia with a voice that conveyed both amazement and envy.

"It is not easy," Marianne answered. "You have to find the pitch the best you can. And aim well." She leaned over the violin, carefully placing the sticker. "There, let's listen and find out if I made it."

• • •

When placing the stickers, Marianne used her fingers and her ears, listening for the right placement by playing, but she also used something else. An intuition, maybe? Or a kind of familiarity with violins and stickers? The students seemed in awe of her ability to determine the exact position of the stickers. And even though Marianne placed them with great care, stickers are wildly inaccurate when trying to truly play in tune. As I wrote in Chapter 8, when tracing the vibrations of violin strings, sound waves produced will, when meeting other sound waves, create diffractive patterns that are perceived as consonances—diffractive patterns pleasing to the ear—or dissonances that are less pleasing. When playing, violinists often tune the note played to either other players or to an inner perception of the pitch aiming for consonances (or the "right" kind of dissonance). This demands great accuracy, much greater than stickers

might provide. But for beginning students, the stickers help them approximately find the right placement of the hand and its fingers.

The missing stickers interfered with Marianne's plans of working with the left hand and its movement under the strings.[133] After placing the stickers, Marianne moved on to practice a piece, and she did not return to the hammock arm with a sleeping baby. As the story continues in the next lesson, the stickers reappear. Or, in a way, they do not. All of them have fallen off.

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Missing Stickers: Version 2, Part 2

Marianne and Sarah were getting ready to play a scale. Marianne, seated in her swiveling chair, let her shoulders fall down with a sigh. Sarah—standing in front of her, quite close—did the same. Marianne's back lengthened. Sarah's back lengthened, too.

"We'll start with a scale today as well," Marianne said. "D major or A major?"

"D major," Sarah answered while raising her violin.

"D major it is. Which rhythm?"

"Apple." Sarah put her bow on the D string, her shoulders still lowered and her back long.

"Let me hear an apple scale," Marianne said with a smile.

As Sarah played the scale, I listened, confused. Was I mixing up the students? Didn't Sarah normally play in tune? It seemed like Sarah was confused as well. She played the first two notes with confidence. The third, an F sharp played with the second finger,[134] was way too high, and she hesitated for a second before playing the next, a G, with the third finger. That was too high as well, and she hesitated even more. Deciding to continue, she played the open A string and then the B in quick succession. They seemed all right to her. But then, the C sharp and the D—the second and third fingers of the A string—troubled her again. When playing the descending scale, she rushed so much that the coordination of the fingers and bow was off. It seemed like she wanted to finish playing the scale as quickly as possible.

"You see, I lost both of them," she said hurriedly, almost before playing the last note of the scale, as she looked apologetically at Marianne.

"You lost your stickers?"

"I opened my violin case, and they were gone."

"Well, do you want new ones again, or do you want to play without them?"

"New ones." There was no hesitation in Sarah's voice.

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133   This is the same movement that Freya practiced when playing Kreutzer Etude No. 8, and that I did when playing the opening chords of Mozart Violin Concerto No. 3 in the story called "Tentacular Time: Version 1."

134   When playing violin, the fingers of the left hand are given numbers. First finger is the index finger, second the middle finger, third the ring finger, and fourth (not used in this scale) is the little finger or pinkie.

"You know what? It might be the warm weather that is causing them to disappear. The glue loses—" Marianne lost her train of thought as she walked over to the cupboard that contained all of her things: her sheet music and stickers, and even some chocolate. Returning with the stickers, she stopped for a moment.

"But actually … what if you don't have stickers and you play? Is there any way you could tell if you are playing the correct pitch or not?" she asked as if thinking out loud.

"Hmm. I don't know."

"What is it that decides if the pitch is correct or not correct?"

Thinking deeply, Sarah ventured an answer. "The fingers?"

"The fingers? Yes, kind of. They do make the pitch. But how do we know that the pitch is correct?"

"By looking at the stickers?" The face of Sarah looked confused. What kind of question was this? How could she know?

"Do you smell the sound?"

I heard the teasing tone in Marianne's voice, and finally something clicked in Sarah's mind. Her face lit up.

"No! We hear the pitch!" she said with enthusiasm.

"That's right! We hear the pitch with our ears. And, fortunately, we have two of them. Now, we'll play again without stickers, and then you'll get new ones."

• • •

In this part of the story, as well as the first part, the missing stickers interfere with the intentions of Marianne. But to think of the agency of the situation as moving from Marianne to the stickers would be to still think of agency as a trait, as something that is possible to "have." Taking the agential realist notion of agency as performed through intra-actions, and not as a trait, requires investigating how the agency is done. Next, I trace the intra-actions of Sarah and the strings.

When Sarah played the D major scale, the frequencies of the strings did not produce what she or I recognized as a scale played in tune.[135] This seemed to surprise Sarah, and it certainly surprised me. We both shared an expectation that the scale would be in tune. Playing the correct pitch is connected to listening to the sound, which Marianne hints at. But it is also connected to bodily sensations and being entangled with the instrument. To play in tune could be connected to the feeling of the placement of the finger on the fingerboard, the feeling of the arm under the violin, the vibration of the string, the wood of the violin vibrating. And

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135   The concept of playing in tune is in itself constituted by material, discursive, and affective intra-actions.

it is connected to visual aspects of playing, of matching the placement of the finger to the sticker and to the sheet music you play by.

From Sarah's surprise by the out-of-tune scale, I imagine that the bodily and visual aspects of playing in tune were normally the dominant ones for Sarah. When the stickers she normally relied on were gone, her playing changed. This assumption is strengthened by Sarah's puzzlement over Marianne's question of what determines the right pitch. Thus, to play in tune was not located *in* Sarah, but it was produced through the intra-actions of her, the strings, and the stickers. When the stickers went missing, the playing changed.

Relying on one's sense of inner pitch provides an alternative to the visual and bodily cues of playing in tune. The inner pitch is one's ability to imagine the pitch, to listen to it inside the head, and then match the pitch sounding to the one imagined. But although this is called an inner pitch, it is also done in intra-actions. As the lesson continued to unfold, I imagine Marianne aimed for strengthening Sarah's sense of inner pitch.

<p style="text-align:center">• • •</p>

Missing Stickers: Version 2, Part 3

"Let's sing the scale. Could I have your bow and violin?" Marianne took them, leaving Sarah with empty hands. "And could you move a little bit closer?" She gently steered Sarah by her shoulders to move closer. "Good!"

Sarah stood close to Marianne, who was seated. Their faces were at the same height and their eyes met. Marianne was smiling. Sarah looked a bit more serious. Taking the violin and bow of Sarah's in her left hand, Marianne lifted her right hand and placed it at waist height with a closed fist.

"Do," she sang and marked the syllable with a movement with the hand. "Re." The next step of the scale was accompanied with a flat hand, palm facing down, slightly above the waist. "Me, fa, sol." Each step of the scale was accompanied by a hand sign moving up and then down again.

Sarah joined in. Her voice blended with the voice of Marianne, and her hands moved with Marianne's hands. They were still facing each other, maintaining eye contact.

"Good," Marianne said and handed the violin and the bow back to Sarah. "Could you sing on your inside while playing the scale? If the sound you are making with your violin is the same as the one you are singing inside of you, then you know that it is correct. You sing beautifully. Soft and nice shoulders. Could you let your shoulders fall? There you go." Marianne touched

the left shoulder of Sarah gently, giving it a slight shake, before Sarah placed the violin on it and lowered the bow to the string.

This time, Sarah played with the good intonation that I expected her to produce. Although the sound quality was a bit timid, almost as if she was playing softly to hear her inner singing, the pitch of every note was very good.

"What do you think of that scale?" Marianne asked when Sarah had finished playing.

"It was good."

"It was very good! Well done! You played in tune without stickers! Do you still need me to put on some new ones?"

Smiling, Sarah shook her head.

"Great!" Marianne looked pleased.

"Olivia, finally, it is your turn to play. Let's find those soft shoulders you had when you played me a D major scale last week. Sarah, leave your violin in the case and grab a bite from your lunchbox."

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By removing the violin and bow from Sarah's hands, Marianne did not only free her hands to do the hand signs. She also moved Sarah's attention from the violin and its stickers toward the scale as something other than the practical execution of putting down the right finger on the right string at the right place. Marianne also placed Sarah close, their eyes at the same height. Although Marianne did not tell Sarah to join in on the singing and moving of hands, the intra-actions she facilitated made it likely that Sarah would join in. And she did. Their voices blended and their hands moved in unison.

Although the agential realist notion of agency does not align with human intentionality, the intentions of humans are not erased. Rather, human intentions become part of the intra-actions of the phenomenon of violin lessons. In this story, the stickers enacted agency. Marianne did not intend to work on Sarah's ability to play in tune, but the missing stickers interfered with her plans. The agency of the stickers, as well as of Sarah, Olivia, and all other agencies of the lesson, intra-acted with Marianne's agency and intentionality. In Finbog's (2020) terms, the stickers spoke, and they were listened to.

Reading this story through agential realism also generate insight into the relationship of intentions and of learning. The way Sarah played the scale before and after the singing, speaks of the dis/continuity of learning. The singing, the hand signs (Sarah did them without hesitation), the trust, maybe even affection, between Sarah and Marianne, all those aspects must have been built and cultivated over time. There was a continuity of learning, of slowly building or

creating or accumulating knowledge, working in the event. This is connected to Marianne's intentions and her finely tuned ability to respond to her students and to the situations they share. But there was also a sudden shift, a discontinuity, in the way Sarah played the scale. The first time she played it, she relied on visual cues and was lost when the stickers were lost. The second time she played the scale, it was as if a switch had been turned on, making her rely on her inner sense of pitch. This is a dis/continuity of learning that is an alternative to developmental and linear concepts of learning.

This dis/continuity of learning is not restricted to students. Researchers also experience learning in leaping and unpredictable movements. As I grappled with the materialized entanglements, the recordings and field notes and emerging stories, from the lessons of Marianne, Olivia, and Sarah, I first noticed the story of the stickers, which I told above. I then noticed how the space within the space was created to not include Olivia. The epiphany that one event could generate more than one story came the night before I had planned the second intra-view with Marianne, and I quickly jotted down the drafts of the stories. When I arrived at Marianne's house the following morning, I was excited to discuss the stories.

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Missing Stickers: Version 3

Marianne welcomed me into her family's home, and we sat down by the large dinner table. After the initial polite conversation about the lessons I had observed, I introduced the stories I had written the night before and asked her to read them.

"What do you think of them?" I asked her. "It is not what 'really' happened. They are stories told by me with my own words. But do you, kind of, recognize them?"

"Yes, I do. And I remember that event."

"Is this how you normally do it? Do you normally not replace the stickers when they fall off?"

"Oh, it all depends on the student. If I think they could do without, I try not to replace them. Actually, I prefer not to use stickers at all. But to do so, I need to have the students in individual lessons, preferably with the parents as well. The students need the support. At the school where you watched me teach, all students start in groups of eight and they learn to use their fingers in that group. Therefore, I need the stickers to give them visual support. Without stickers, I need to guide the student more physically. I need to help them find the feeling of the hand." While talking, Marianne lifted her left hand and, with her right, shaped it into a hand where the fingers curved toward an imaginary string.

"And the solfa-singing gives a lot of support," she continued. "I used it more before when I first started as a violin teacher. My colleagues do not use this way of singing, and I feel like it is better if the students learn it at lessons and in orchestra rehearsals and all that. But the last couple of years, I have started using it anyway. It is a very good way of supporting the development of a good intonation."

"Yes, it really is. When I listened to the recordings, I noticed how the singing and the hand signs supported the playing. It was almost magical the way Sarah played in tune after singing."

"I know! What you do with the hands, is that you move them up and down, right?" Marianne lifted her arm into a do-sign. "And when the student has a feeling, a physical feeling, of the steps of the scale, and I—" Marianne sang do-re-mi and showed the signs as she moved the hand upwards—"and I can do like this, on the second finger." As she sang "mi" again, Marianne slightly raised both the pitch of her singing and the position of her hand.

"What? Can you do that?"

"Yes! I adjusted the pitch with my hand, and Sarah did the same with her finger."

"I didn't notice!" I felt both inspired—imagining how I might use this with my own students—and embarrassed. How come I had not noticed this, even after listening to this part of the lesson so many times?

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When Marianne told me how she is able to tune the pitch the student is playing just by raising her hand, I was flabbergasted. The possibility of doing so had never before entered my mind, even though I had used the hand signs in singing and playing scales with students before.[136] When Marianne told me this, the intra-actions of the lessons, already told in two different stories, took on a third shape and meaning. I had noticed how entangled the bodies of Marianne and Sarah were, but I had thought of their entanglement as one of correspondence. I had noticed how Sarah's back lengthened when Marianne's back lengthened and how the relaxed arm that Marianne placed on Sarah's shoulder created less tension. I imagined the entanglements of their bodies as similar to what might be found in a mirror. What I had not noticed was how the correspondence also related to the sound from the frequencies of vibrating strings. The vertical movement of Marianne's right hand, initiated by the low pitch produced by Sarah's middle finger and its placement on the string, created a response in Sarah's hand as a horizontal movement of her finger in order to change the pitch. The pitch—the sound waves—doesn't relate to vertical or horizontal movements but, instead, to the string's oscillation speed. The entanglement of the bodies is not linear or representational; it is an entanglement forged by relationality and shared learning.

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136   This is a reminder that although I find it useful to draw on my professional knowledge as a violin teacher when doing inquiry, this knowledge—like all knowledge—is partial, situated, and incomplete.

In the intra-view, Marianne also talked of how the materialdiscursive structures surrounding the lessons—how much time they have, how many students are taught in one lesson, and how much parental support the students have, and the teaching of her colleagues—shape what is possible and not possible to learn in the lessons. I return to some of these questions in Chapter 11 in which I discuss the im/possibilities for becoming violinists that are created in the intersections of race, gender, and class.

Staying With the Violins

In this chapter, I have expanded on the understanding of violins as tentacular, which I developed in the previous chapter by exploring the agency of the violins in violin lessons. By reading stories from violin lessons through agential realist concepts of touch and agency, and through Finbog's (2020) work on duodji, I have explored how the intra-acting agencies of the lessons co-constitute the learning, teaching, and playing done. In the following interlude, I bring the insights from this and the previous chapter together in the concept of tentacular and agentic violins.

Interlude III: Tentacular and Agentic Violins

In the previous two chapters, I have explored violins. But not violins as bounded, pre-existing objects. Taking my violin and the violins of the lessons as starting points, I have explored the strings of violins and their connections to discourses, matter, and affects; to histories and traditions; and to the way agency is distributed across intra-acting agencies in the enactments of violin lessons. Through these explorations, the concept of *tentacular and agentic violins* has emerged. The violins are tentacular in the sense that they are connected to other parts of the world by a myriad of strings, and they are agentic in the sense that they do agency and take part in the enactments of the world.

The concept of tentacular and agentic violins is an alternative to the mute and passive instruments of humanist music education research. Concepts are apparatuses enacting agential cuts. The concept of tentacular and agentic violins is useful for generating insight into the phenomena of violin lessons. By paying attention to the tentacular and agentic violins, it becomes possible to generate better understandings of how violin lessons are enacted and what they produce, and, thus, to foster some worlds and not others (Haraway, 1994).

In the following chapters, I bring together the insights and concepts generated through the diffractive readings of Chapters 6–9 together. From Chapters 6 and 7, I bring the concept of topological togetherness which offers insight into the becoming of spacetimematter. From Chapters 8 and 9, I bring the concept of tentacular and agentic violins and the insights developed on how violins work. Together, they generate possibilities for investigating the differential im/possibilities for becoming violinists.

Chapter 10: Becoming Violinists

The question of how violin lessons are enacted and what they produce, as well as the endeavor of answering it, has dissolved, and been replaced by concepts that work as apparatuses enacting agential cuts. But my interest in what violin lessons produce lingers. And although Snaza and Weaver (2015), as referred to in Chapter 2, critique education research that assumes answers start with the phrase "education will make the kind of human who can … " (p. 2), I am interested in the becomings of the humans of violin lessons. How might I engage with productions and becomings, including the becomings of humans, without adhering to linear and humancentric thinking? The agential realist conceptions of diffraction and subjectivity might generate possibilities for doing so.

To diffract, to trace where differences appear, is premised on a will to re-turn, to turn over and over, and to intra-act again and again (Barad, 2014). Thus, diffraction holds the potential to think of becomings in ways other than the linear and developmental ways that are dominant in education research (e.g., Murris, 2016), and diffractive thinking opens up the potential for engaging with dis/continuities in playing that relate to the topology of space and time, which I engaged with in Chapters 6 and 7.

The agential realist concept of subjectivity—a concept that has been at work in this dissertation the whole time in the form of shifting researcher, teacher, and student subjectivities—is not configured once and for all. Subjectivity, like all concepts, is a living and breathing (re)configuring of the world, and we need to be responsible for and responsive to it. In the introductory chapter, I introduced the subjectivity doing this inquiry as a subjectivity differentially constituted by material, discursive, temporal, spatial, and affective intra-actions. I also positioned myself in relation to social categories and as a part of a nation with a colonial history and present. This is aligned with Barad's claim that "issues of political economy and cultural identity are inseparable" (Barad, 2007, p. 226).

In this chapter, I tell stories from violin lessons, and I read them diffractively through the agential realist concepts of subjectivity. I also bring the concepts of topological togetherness and tentacular and agentic violins, which emerged through the readings done in the previous chapters, into the readings in this chapter. Topological togetherness enables an attention to how violin lessons are done in entanglements and togetherness while not being confined by a bounded space or time. The concept of tentacular and agentic violins enables an attention toward the ways violins do agency in the differential becomings of violinists.

The point of exploring bodily productions, like the differential becoming of violinists, is "to get at how worlds are made and unmade" (Haraway, 1994, p. 63). By paying attention to the differential becomings of violins and the particularities of the intra-actions taking part in this bodily production, it becomes possible to participate in the process—to be response-able to the process (Barad, 2014; Barad & Gandorfer, 2021)—and to "foster some forms of life and not others" (Haraway, 1994, p. 62).

In this chapter, I mainly turn our attention toward the intra-actions of students, teachers, violins, music stands, cameras, and of the traditions of violin playing. In the following chapter, Chapter 11, I relate these to the social categories of race, gender, and class. All through these two chapters, I bear in mind that "issues of political economy and cultural identity are inseparable" (Barad, 2007, p. 226). The separations made are agential cuts, not absolute separations (Barad, 2014).

The first part of this chapter explores how Nora, one of the students, was shaped into a violin-playing body by her teacher Astrid and how Astrid's camera made this body into a set image that was sent as a picture to Nora's mother. The second part of this chapter starts from the string quartet Nora was a part of and explores how the four students became a string quartet through intra-actions. The third and last part of this chapter explores how Freya, through the lessons, became a student that might, one day, become a professional violinist.

Becoming a Violin-Playing Body

In this section, I trace the intra-actions that produce a violinist's body, and I will soon tell a story from a violin lesson that explores some of these. But as I started grappling with this story, questions of what came before emerged. How come the students play the violin in the first place? By pondering this, the inseparability of issues such as political economy and cultural identity became tangible. For a body to become a violin-playing body, the child must first of all play an instrument, and then play the violin and not some other instruments. Access to the SMPA is related to class (e.g., Jeppsson & Lindgren, 2018), and instruments in SMPA are gendered (e.g,. Blix & Ellefsen, 2021). Thus, gendered and economic structures are already at work before the lessons begin. In the following exploration of how Nora's body was shaped into a violinist's body, I bear in mind that the story I tell is not a beginning. We enter in the middle of a knot of entangled strings to explore some of them and their specificities.

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Shaping the Body

When I entered the room, Astrid and Nora had already started the lesson. Nora, a nine-year-old girl, stood with her violin and bow raised, as if ready to play. Astrid circled around her, watching her closely. She sent me a quick smile before turning her attention back to Nora.

"Great!" Astrid said as she lifted Nora's right elbow slightly. "May I take your picture and send it to your mother? Then she will know how you should look when practicing." Astrid raised her cell phone.

"Yes, and she could look at the bow hold." Nora lengthened her back a bit more, posing for the picture.

"Please stand perfect for the perfect picture. Up a bit," Astrid said as she moved the violin slightly and took a step back to get an overview of Nora. "There you go. Perfect!"

Astrid lowered the phone to look at the picture. "Now your mum has homework, too. She is to make sure you are standing perfect. Let's play "Deilig er den himmel blå."[137] She looked up at Nora again. "Oh," she sighed. "You turned your feet. Let's get you all stacked up again."

With great care and slow movements, Astrid placed Nora's feet so they pointed slightly outwards, the left foot pointing toward the music stand. Then, she turned Nora's body to the left to make the weight of her body fall slightly more onto the left foot, raised her violin, and placed it on Nora's shoulder. She then placed the bow in Nora's right hand, shaped the fingers around the frog, lifted the bow and the arm, and placed the bow's hairs on the D string close to the frog.

With gentle shaking movements, Astrid felt Nora's bow hand with her hand, loosening the muscles. She shaped Nora's thumb into a bent position, placed the pinky slightly closer to the other fingers, raised Nora's elbow a fraction, and moved slowly away while scrutinizing the posture. She smiled.

"Beautiful! And play!"

As soon as Nora started playing, her posture changed. She moved her feet and turned the body back from the slight twist Astrid had given it. The violin sloped down again. The thumb, so carefully crafted into an inward bend by Astrid, soon bent the other way.

Before Nora played the song again, Astrid patiently shaped her body. As soon as Nora started playing, her body slumped back into its habitual position. Astrid shaped the body again. And Nora played in her usual way. This happened again and again. But every time they repeated this little dance, Astrid spent less time shaping Nora's body, and the changes Nora made when playing became smaller. At the end of the lesson, Astrid seemed slightly more content with Nora's posture.

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137   A Christmas carol.

Feminist new materialist and posthuman scholars have engaged with children's becoming through tracing mundane and everyday objects and activities (e.g., Osgood, 2019; Osgood & Mohandas, 2021), and I diffract their work, as well as Barad's work, through this story. By reading this story diffractively, it becomes tangible how Nora's body was becoming a violinist's body in its intra-actions with the violin, the bow, the music stand, Astrid's touch, the camera Astrid use to take a picture, and the norms of violin playing traditions.

First, I explore how Astrid and Nora intra-acted with the violin, the bow, and the music stand, and how becoming a violinist's body is to become a body that takes its shape from these material agencies. Then, I turn to touch and how the touch of Astrid shaped Nora's body. Finally, I explore how becoming a violinist's body requires becoming intelligible as a violinist, and I look at the role the camera played in making Nora intelligible to her mother. I end the diffractive reading by collecting the strings of power that run through this reading. How does power work in these becomings? How is it that Astrid has the power to shape Nora? Does Nora resist? If so, in what ways? How is the becoming of a violinist's body related to the strings of violin playing I made tangible in Chapter 7?

Becoming With Violin, Bow, and Music Stand

When Astrid moved the limbs of Nora around, she placed them not only in relation to her other limbs but also in relation to the violin, the bow, and the sheet music that was placed on the music stand. Nora's placement of her feet is the first thing Astrid corrects, and the placement is determined by the music stand. Drawing on my professional knowledge, I am reminded of how beginner students tend to prefer to see their fingers when playing and of how they often rely on visual perceptions rather than auditive or tactile ones.

I imagine this is what happened in the story of playing scales with missing stickers. When Sarah first stated that looking at the stickers helps her decide if the fingers are placed in their proper positions, she relied on visual, rather than auditive, cues. This reliance on the vision often affects the position of the body because the students try to see both the finger board and the sheet music at the same time. To do so, they move the violin toward the middle of the body, thus restricting the hammock-movement of the left arm, which is so important. I imagine that the way Astrid turned Nora's upper body, including the head, was a response to that movement pattern. But Nora moved her body back to its original position. Was that an act of habit or of resistance? Or maybe both? I return to this question shortly. First, I want to turn our attention toward the assumed stability of violins.

The exploration of my tentacular violin in Chapter 8 showed that the shape of violins has, to a large extent, been the same since the sixteenth century. The shape and form of violins

stayed seemingly fixed in the lessons except when a decision was made to move a student up to playing on a bigger violin. The bodies—like Nora's body in the story—were expected to form themselves and be formed by the teacher, around and with the instrument, taking the shape that accommodated the playing and not the other way around.

Nora's thumb, the one that was bent inwards by Astrid but slipped into an outward bend because it lacked the strength required to stay in that shape, was the one corrected and reshaped. It was not expected that the bow be made shorter or the frog be made larger and easier to grip. Other instruments, in particular wind instruments, have been remade to make it easier for beginners to play (Jesse, 2020). There are available modifications to bows like bow hold buddies,[138] but they were not used in the lessons I observed. With the exception of stickers on the fingerboard, I did not notice any modifications of the instruments.[139]

Although no parts of a phenomena of violin lessons are stable and unmoving, the privilege given to the violin over the violinist's body becomes tangible through the reading of the story. As I discussed in a previous chapter, that is not to say that the violin is unmarked by the violinist's playing. But the shape of the violin, the size of the fingerboard and neck, or the distance between the strings, is not subject to change depending on a violinist's hand size. This lack of precedence for adjusting, modifying, or changing the instruments has implications for what kinds of bodies might become violin-playing bodies, and I engage with this question when discussing power. But first, I re-turn to touch.

Becoming with Touch and Affects

Affect theory draws attention to the body and emotions, to the power to affect and to be affected, and to the relationship between these two (Clough & Halley, 2007; Dernikos et al., 2020b). In Barad's (2012) work on touch, "touch is never pure or innocent. It is inseparable from the field of differential relations that constitute it" (p. 215) and "touch moves and affects what it effects" (p. 208). I find that touch and affect both pay attention to the relational forces that move between human and nonhuman bodies. Reading the previous story as a story of Nora's and Astrid's bodies touching and affecting each other allows other insights on the bodily becomings of violinists to appear.

Murris writes about the affects of Barad's scholarship and states that "being affected is more than emotion or feelings; it is a mutual performativity that troubles cognition/emotion, nature/culture, and inner/outer binaries" (Murris, 2022, p. 22). The inner/outer binary of

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138   An example can be seen here: https://www.thomann.de/gb/things_4_strings_bow_hold_buddies_b_b.htm.

139   Some students used shoulder rests and all of them used chin rests. These are commonly used by professional players and could be considered a part of the assemblage of violins, not as modifications.

Nora's and Astrid's bodies was troubled by the way Astrid gently shook the hand of Nora, transforming the level of tension in her muscles and the shape of her hand. In that touch, the boundaries between their bodies were porous, allowing affects of relaxation to flow between them. I imagine that the entanglements of Astrid and Nora were also constituted by their attunement toward each other. The affects that moved between them might have been affects of trust; Nora trusted the touch of Astrid to be friendly and safe, and Astrid trusted Nora to let her touch her. There might also have been affects of resistance, of Nora trying to keep her body and her playing the way she was used to it being. But in order for Astrid, and Nora's mother, to recognize the body as a violinist's body, it needed to be changed.

Becoming Intelligible as a Violinist

When Astrid was satisfied with the shape of Nora's body, she took a picture. The camera temporally fixed Nora's body in the shape created by Astrid, and the picture was sent to Nora's mother for her to use as a reference when Nora was practicing at home. Thinking through agential realism makes it possible to understand how Nora's body became intelligible as a violinist's body through these intra-actions.

According to Barad, "intelligibility is a matter of differential responsiveness, as performatively articulated and accountable, to what matters" (Barad, 2007, p. 335). The responsiveness to what matters reads, for me, as the ability to respond to the world in its materializing. As Nora's body materializes as a body in the shape of a violinist, it must also be recognized as a violinist's body, and it must be responded to *as* it materializes. Astrid is able to respond to this materialization because she is familiar with the shape of violinists' bodies. She comments on Nora's shape, but she also responds by her smile and touch, by her attention to the details, and by her entanglements with Nora's body. Nora becomes intelligible as a violinist through Astrid's responsiveness to her becoming.

Taking a photo—capturing the shape of the body and sending it to Nora's mother—moved Nora's intelligibility as a violinist outside of the lesson and into her home. It also stabilized it. In the story, I observed how the body of Nora, as soon as she started playing, took its accustomed shape. Using the picture as a reference makes it possible to re-member, both for Nora and her mother, the becoming of a violinist's body. Taking the topological notion of temporality into account, the past—the lesson—and the future—the home practice—are enfolded. By sending the photo, Astrid, and her camera, took part in this enfolding.

To become intelligible as a violinist is dependent on being recognized as a violinist. As with being a duojár,[140] being a violinist is done in a community or in a state of togetherness. Astrid

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140   A practitioner of duodji.

does not need a picture to recognize when Nora's body is a violin-playing body. Astrid's own body is a violin-playing body, and she has been immersed in a network of violins and violin-playing bodies for many years. But Nora's mother might need a photo as a reference. Thus, the picture taken and sent becomes a part of a topological togetherness in which the temporal and spatial connectivities are not only reliant on a geometrical notion of space and time but also created by the technology allowing Nora's mother to see the shape of Nora's body in places and at times other than in and during the lesson where it was shaped.

Through these re-turnings of the story of Nora's body being shaped, I have grappled with how Nora's body became a violinist's body with violin, bow, and music stand as well as with touch and affects. I've also pondered how it became intelligible as a violinist's body outside of the lesson. All through these re-turnings, power has been at work. In the next section, I explore how power take part in the becoming of violinists.

Becoming With Power

In this section, I first turn to how violins are given primacy over humans and how they create norms of violinists as able-bodied and adult. Then, I turn to the affects and touch in the lesson, discussing how the teacher, Astrid, although kind and gentle, exercised power over the student, Nora.

Able and Adult Bodies

Shaping the body to the violin, and not the other way around, gives violins primacy. As I explored in chapter 7, violins are tentacular and agentic, and they are connected to capitalist, colonial, and patriarchal structures that privilege the humanist subject: a white, able-bodied, and adult man. I explore the aspects of race and gender in the following chapter. Here, I turn to ability and age, and how these norms worked in the lessons.

To play the violin, also at a beginner level, requires a body that, in most aspects, is able. To the best of my ability, none of the students I observed challenged this norm. This aligns with the research on SMPA that suggests that students with disabilities are underrepresented in SMPA (Laes & Westerlund, 2018; Rian, 2019; The Norwegian Directorate for Children, Youth and Family Affairs, 2017).

But all of the students challenged the norm of being adult. Nora was not only a beginner violinist but was also a child beginner violinist. In the lessons, I saw no modifications of violins to take into account that the bodies of children differ from adult bodies in aspects other than size. One possible reason for this could be that there is no need to modify violins;

they are perfectly playable by children as they are. Another could be that the transition from a modified child violin to a violin would require more effort than the benefits would justify. But recognizing these possible reasons does not exclude the possibility that the traditions of violin playing and its norms and values privilege adult and able bodies, and that part of becoming a violinist's body is to adhere to these norms.

The norm of adult bodies is also detectable in SMPA related research. As I demonstrated in Chapter 2, most of the research relies on adults in the capacity of being teachers or leaders. I have found no studies where the students of Norwegian SMPA are interviewed or otherwise engaged with.

The Power of Touch and Affects

The shaping of Nora's body revealed that there were affects working on and between the human and nonhuman bodies. What is the relation between power and affects? What decides which affects have effect? As I read the story of Astrid and her shaping of Nora's body through affect theory and Barad's concept of touch, I recognized affects of trust, which seemed to allow the affects of Astrid's intentions around shaping Nora's body to work in such a way that Nora's body took the intended shape. But this is an assumption that might very well be troubled. I observed lessons with two of Linda's students, but only Freya's lessons are included in this dissertation. As I wrote in Chapter 5, the other student told Linda halfway through the period of observation that they wanted to have another violin teacher the following year. This made the situation between them a bit complicated. It also changed how I perceived the lessons and the affects working between student and teacher This reminds me of how I, as a researcher, am not a neutral apparatus, but an intra-acting part of the phenomena in question. Thus, the affects grappled with are not affects that are already there; they are becoming through the intra-actions in which I take part: By writing about them, I bring them into existence in new configurations.

There were many situations, both in Marianne's and Astrid's lessons, where the teacher touched the students. When writing of these touches, I use my own experience as a teacher and think about how I use touch, and the touch of Marianne and Astrid becomes with these thoughts. Marianne also talked of touching in the intra-view and of how she shapes the body of the students by placing a heavy hand on their shoulders to make them relax and to let the tension melt away. Astrid uses a method developed by an instrumental teacher to strengthen specific muscles. As the muscles needed when playing—for example, the muscles that connect the pinky and the thumb of the right hand, which are crucial for holding the bow—are strength-ened, the other muscles do not have to compensate for the lack of strength, and, thus, they might relax. This strengthening is done through exercises, but also through Astrid touching

the specific muscles to make the students aware of them and how they work. The touching between students and teachers did not, as I saw it, communicate affection or care. Nor did I notice the use of touching to comfort or to encourage the students. Touching was used as a way of shaping and transforming the students' bodies into violin-playing bodies, and, thus, as an act of power.

In this section, I have read the story of how Nora's body was shaped into a violin-playing body diffractively through concepts of touch, affects, and power. In the following section, I continue to explore the productions of violin lessons, this time through telling a story from a rehearsal with the string quartet Nora played in.

Becoming a String Quartet

String quartets became popular ensembles in the second half of the seventeenth century and consists of two violins, one viola, and one cello (Stowell, 2003). In a student repertoire, the viola parts are often also written for a third violin as there are fewer young viola students than violin students. This was the case in the string quartet that consisted of Nora and two other violinists, Ada and Anna, as well as the cellist, Helena. They were all girls between the ages of 8 and 10, and their quartet was formed as part of a chamber music project in their string orchestra. One of the things that distinguishes a quartet from four musicians playing at the same time is the way a quartet comes together as one breathing, moving assemblage. In this story, Astrid guided the four young quartet players through a set of exercises disguised as games to teach them how to start playing together.

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Starting Together: Part 1

Anna arrived ten minutes after the rehearsal should have started. But nobody seemed to mind her being late. As she entered, Nora and Ada were opening their violin cases. Helena had already placed her cello beside her chair and was looking for the right sheet music in her ring binder.

"There you are. Great!" Astrid smiled as she welcomed Anna. She looked at the four chairs and the music stands she had placed in a semicircle, and turned to the students. "So? Are you all ready for Thursday's concert?"

"What? Thursday already?" Ada was astonished. The others also looked confused.

"Yes. Thursday." This information spurred a cascade of questions. Astrid answered them as best as she could while tuning the instruments and instructing the students on where to sit. The students wanted to know all kinds of details and became worried that they would forget. Astrid calmed them down by explaining that all of the information was already sent to their parents by email. By a quarter past four, all instruments were tuned, most questions were answered, and three violinists and one cellist were ready to start playing.

"Put away your instruments," Astrid said to the students' surprise. "Clap with me." The sound of Astrid's sudden clapping startled the students. When she clapped again, they had their eyes fixed on her arms. She would give no sign that she was about to move before suddenly: clap! The students were too late in responding. Astrid clapped again, still without giving a sign beforehand. The students were late again.

As the frustration built up in the room, Astrid lowered her hands. "It's really difficult to know when to clap if I don't give you a signal. But try this." Astrid moved her arms out and then back into a clap. This time, the students were almost on time. "Great! Did you notice how I moved my arms in the tempo we are about to play? Watch!" This time, they clapped as one set of hands.

"Would you like to try? Helena first!"

Each of the students clapped, and each succeeded in leading the rest of the group. They smiled, clearly enjoying this game.

"Let's do the same with the instruments. Play two open D strings. Feet on the floor!" Four set of feet tramped on the floor and four backs straightened.

"Wait a minute. These stands are too high. You are not able to see each other." Astrid put down her violin and quickly adjusted the music stands.

"Right, look at my bow and how I move it out," Astrid moved her bow arm out and away from the violin. "And then in again in tempo. And boom!" The last two words were spoken in rhythm. As Astrid said "boom," all four students played with her on an open D. "Great! And now you try. Ada will start."

Equally proud and embarrassed to be given this responsibility, Ada moved her arm out and then in again. It was too quick for any of the other students to follow her. Encouraged by Astrid, she tried again. And again. Each time, the movement became a little less rushed, and Ada gained a little more authority. She continued trying until she got the quartet to play together.

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How come Ada, when doing the movements she had done so masterfully just minutes before, rushed when holding the violin and the bow? Although I use the word "Ada" as a shorthand, "Ada" is not a singular, bounded, human individual. She is, like all of us, becoming through

intra-actions. And her becoming, the possibilities and impossibilities of her movements, changed as she intra-acted with the violin and the bow. Her tempo, her presence, her being a part of the quartet, changed. I cannot know if it was the case for Ada, but I know that, in my body, rushing movements are related to a quick pulse, raised body temperature, butterflies in the stomach, and shallow breathing. These bodily reactions are created by the responsibility of leading an ensemble and are intensified by doing so while holding an instrument. It might be that Ada experienced some of these affects when she was asked to start off the quartet.

I imagine that Astrid has also experienced these bodily reactions related to leading an ensemble. When instructing Ada, Astrid asked her to breath with the movement. By breathing, something changed in Ada's movements. As Ada breathed in and swung the bow arm outwards and breathed out and made contact with the string, the movement became calmer and more authoritative. It started working as a movement leading the quartet. It became intelligible to the other students who were able to understand her cue and start playing at the same time. The body and the breath and the violin were entangled with the bodies and breaths and instruments of the others in the quartet. They were also entangled with the room. As the rehearsal was enacted, the intra-actions of the humans and the room continued.

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Starting Together: Part 2

"Let's try something new. Ada, you walk to that corner." Astrid pointed to one corner of the room, and then the next. "Anna, please stand over there. And Sarah, you take that corner. Helena, you can remain seated with your cello."

The students exchanged puzzled looks but did as they were told without questioning it.

"This time, you are the boss, Ada," Astrid said. "Start your quartet playing the scale."

Ada enthusiastically lifted her bow and played a down bow with such speed and energy that the movement continued beyond the length of the bow. Unable to connect to the string again, she stopped.

"Oops, did the bow become too short? Maybe your arm has grown? I guess you'll need a bigger violin soon. Maybe after Christmas?" Astrid smiled as she saw Ada's puzzled look.

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Ada's bow had not shrunk, and her arm had not grown in the seconds since she last played. But something had changed as Ada stood up and moved to another part of the room. Her energy, her engagement, her speed, her feeling of her own movements—they all changed the

possibilities and impossibilities for stroking with the bow on the string. I did not ask Astrid about why she made the jokes about Ada's arm growing, but I guess, from what I would have done, that she wanted to lighten the mood and to give Ada a couple of seconds to collect herself before trying again. And it worked.

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Starting Together: Part 3

"All right, try again," Astrid said.

Ada moved her arm out and breathed in as the arm swung in. The quartet started on the scale at the same time. Although slightly less precise than when they were seated, they still played quite nicely together.

"And now!" Astrid's voice was filled with the promise of something fun to come. "Turn away so that you can't see each other."

In on the game, the students turned to face the corners of the room. Even Helena, seated with her cello, turned her chair around.

"How could you possibly know how to start together when not looking at each other?"

"Maybe you could count us in?" Nora suggested.

"Yeah, I could." Astrid seemingly considered the possibility. "But is there any other way?"

"How about we listen?" Ada didn't sound too convinced about her own suggestion, but Astrid's face lit up.

"Yes!" Astrid cheered. "Nora, you start the quartet by breathing."

Silence filled the room. Then, I heard the sound of Nora breathing in before the quartet started playing the scale perfectly together.

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To become a string quartet is to become something more than the sum of four individual players. By breathing and moving and playing together, the students formed the quartet. They did so by intra-acting with each other. There were forces moving between them, forces that were not verbalized. If they had counted to four before beginning, that would have been an auditive cue. When they were looking at each other, they relied on visual cues. When they turned away and did not count, these cues were taken away. What was left? What was the cue that made them start together? There might have been an audible sound of Nora breathing in, but there was also an affect moving in between them that made the right moment to start playing the right moment for all of them at the same time. Although the students and the teacher played important roles, the becoming of the quartet was not restricted to the

intra-actions of humans. The instruments and the room, the chairs and the music stands, they all took part in the changing intra-actions through which the quartet came into being.

Becoming a string quartet is different than becoming a violinist. Not oppositional, but different. In becoming a violinist's body in the story of how Nora's body was shaped and this shape was photographed for the mother to see, Nora's body was intra-acting with the violin and the bow, with the music stand and sheet music, and with Astrid's body. But although Nora's body was entangled and intra-acting, it made sense to think of it as one part of the phenomena. It made sense to think of it as one body. When becoming a quartet, the entanglement of the four bodies of the students takes another form. Their bodies—always entangled and intra-acting—are not the "thing" becoming. The quartet becoming is an entanglement of the bodies and the instruments and the room and the instructions and demonstrations of Astrid. In raising her violin, and, thus, her pulse and body temperature and the speed of her movements, Ada was entangled with Helena, Nora, and Anna, and this entanglement became tangible. Ada's movements were entangled with the others' movements and with the sounds produced.

Until now, I have explored the becoming of a violinist's body and a quartet by paying attention to the affective and material intra-actions of bodies, instruments, and rooms. In the following section, I explore the becoming of a professional violinist by emphasizing the way discourses shape the possibilities and impossibilities for future becomings. The material and economic aspects of this becoming is the main focus of the following chapter.

Becoming a Professional Violinist

The Norwegian SMPA's curriculum framework states that the schools shall give opportunities for in-depth training that prepare students for upper secondary and higher education in arts and culture (The Norwegian Council for Schools of Music and Performing Arts, 2016). Although higher education in music is not the only pathway to becoming a professional musician in every genre or instrument, it is the most common route for classically trained violinists. Thus, to have the opportunity to play violin as professionals, the students in this inquiry must pass entrance exams to higher music education, and the tutoring they receive in SMPA should give them the opportunity to prepare for this.

The possibilities for future auditions were not a topic in Astrid's or Marianne's lessons. This might be due to the age of their students, but as I also sat in on a number of lessons with older

students—lessons that informed and inspired my thinking and writing but did not make it into the dissertation as stories—I noticed that it was not a topic for them either. Thinking about the future, what the future might look like and how to prepare for it, was restricted to thinking about the upcoming holidays and the songs associated with them and to the concerts that they were preparing for.

Linda, on the other hand, expressed clear expectations and plans for her students to enter the path toward a professional career, and these plans shaped the activities of the lessons. In Chapter 7, I explored one temporal configuration of violin lessons as I told the story of how a lesson with Linda and Freya was working with me one year later. Now, I re-turn to that event and tell another story to explore another aspect of the topology of time by paying attention to the entanglements of Freya's past and future.

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Tentacular Time: Version 2

Freya had played a scale, and she was about to play it again. This time, Linda asked her to find a technical element to focus her attention on. Freya had a hard time deciding which one.

"Could I suggest something?" Linda asked. "You played Kreutzer E major last lesson, and we talked about how to steer your arm, didn't we? When you are playing on the G string, you are here," Linda held her violin at her shoulder and showed how her arm moved sideways under it, enabling the fingers to reach the G string. "And you move your arm like this. You try."

After locating the etude, first in her head by remembering which of the 42 ones it was, and then by locating the sheet music, knocking down the music stand and putting it up again, Freya played from the beginning. After some bars, Linda stopped her.

"You see, the point of this etude is that you start with your arm like this." Linda played the first couple of notes, her left arm elbow pointing toward the center of her body. "And when you play at the E string, the elbow is pointing downwards." She adjusted her position for the camera to better capture her movements.

"I'm sure you remember this song," Linda said and started singing a joyful, little tune about a hammock.

"Yes!" Freya hummed the tune.

"When we played that one, when you were five years old, we were practicing the same thing as we are practicing now. At that time, I was thinking to myself that this girl will play Kreutzer E major, and she will need to be able to move her arm under the violin."

"Aha!" Freya giggled.

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As I wrote in the previous reading of this story, the Kreutzer etudes are often used when playing auditions for higher music education. To practice etudes is also considered key to developing a sound and effective playing technique. Although all elements of violin playing work together, each etude often highlights a couple of elements. The key of E major and the melodic elements of this etude demand an extra attention to how the arm enables the fingers to reach the sharp notes. When Linda told the story about Freya's early days as a violin student and how they practiced the hammock movement, she also storied a potential future in which Freya auditions for higher music education. At least, this is how I perceive Linda's actions based on my knowledge of how violin auditions work. I do not know if the story worked for Freya in the same way. But for me, Linda was storying a future professional violinist through her connections to the children's song with accompanying movements and the etudes that they were playing in their current lessons.

It matters which stories we use to tell other stories with. And through the storying of Freya's past and future, possibilities for becoming a professional violinist are created. The violinist Freya is becoming through the lessons, is a violinist capable of playing Kreutzer etudes and of remembering which etude is the one in E major. She becomes a violinist that not only might enter higher music education, but also a violinist capable of navigating the musical and social expectations directed at music students. As I told in Chapter 2, I experienced a lack of cultural capital as a student in higher music education. Part of this capital could materialize as the ability to effortless navigate the keys and numbers of the Kreutzer etudes and to play the first couple of bars of any of them from memory. I do not know if Freya recognized the story told of her and how it shapes her possible futures, but a violin teacher would. By fitting the image of who might become a professional violinist, the possibility of becoming a professional violinist is created.

When I explored the strings of violin playing, starting from my violin, I traced a string of teachers and students from Bériot to Freya. This connection was not explicitly articulated in Linda's lessons, but the tradition of violin playing manifested itself in an imagined future professor (in my imagination taking the shape of Bériot) sitting in the corner of a music studio.

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Playing With Bériot

"That open string, you need to play that," Linda interrupted the playing of Freya. Freya stopped, put down her bow, and picked up a pencil to write on the sheet music composed by Bériot,

who taught the teacher of the teacher of the teacher of the teacher now telling her to put her own mark on the sheet music he composed.

"I'm very happy to see you taking notes on your sheet music," Linda continued. "You are all becoming real music students. You know, like I told you, with the professor sitting at the far end corner giving comments, and you have to take notes yourself. That is a good thing with Skype lessons, it is more like … well, try playing that open string."

• • •

Through annotating the sheet music, Freya added her mark to the generations of markings that were already there. When I did the same, in the story of how I played with my grandmother's hands and our weak, little pinky, I marked the sheet music from a place of resistance. I resisted the fingerings already there, creating others more suitable for my smaller hands and my weak pinky finger than those written by men with (presumably) larger hands. By looking at my copy of the sheet music, I could tell that the open E string that Linda told Freya to play was already printed. By picking up her pencil and adding something, I assume that Freya emphasized what was already there, maybe adding a larger 0 or circling the printed one.

When playing in orchestras, two violinists share one music stand. It is considered bad manners to add one's own fingerings. Bowings are always marked, as the bowings of a violin section are supposed to be uniform. But fingerings are personal, adjusted to the taste, physics, ability, and preference of each violinist. Some fingerings, like the ones I added, might mask a technical weakness. Others might result from a particular musical taste or preference. (In these cases, the principal might discretely make sure that their fingering in that particular phrase is notated and taken notice of.) Others, like the open E string of this Bériot piece, might make a technically demanding phrase easier to play.

Linda's comment on how Skype lessons are making Freya and her other students more like real music students suggests that the troubled togetherness—their lesson being held online in a room where they were together but not in the way face-to-face lessons are together—changed the dynamics of writing on the sheet music. I imagine that maybe Linda did this annotation previously. By moving the lessons online, the COVID-19 virus took part in storying Freya as a future student of music by troubling the togetherness of her lessons and making her into a note-taking student.

Another agency at work on Freya and her future possibilities were her parents. Through the way Freya and Linda talked about Freya's home practice, I got the impression that Freya's mother had been practicing with her for an hour or so every day for years, and that Freya

only recently had started to practice by herself. Linda also shared with me the practice plans for Freya. Written partly by Linda and partly by following a scheme from the talent program Freya took part in, the plans divided the practice time into sections, each section with one or more specific tasks, and allocated the number of minutes to spend on each section. Freya seemed to expect that someone would check up on her practicing. On one occasion, she warned Linda that her mother might ask Linda if Freya had practiced the 15 minutes that she did not have a chance to fit in the day before.

Freya started playing at the early age of five years old, and she has dedicated parents who practice with her and, now that she has started practicing alone, monitor her practicing. These aspects of Freya's life point to how the possibility of Freya becoming a professional violinist is created by life situations that transcend the violin lessons. As this chapter has shown, the becoming of violinists and quartets is done by a myriad of intra-acting agencies. I continue the exploration of what violin lessons produce in the following chapter where I explore the differential becomings of violinists in the intersections of the social categories of race, gender, and class.

Chapter 11: Becoming in the Intersections of Race, Gender, and Class

In the previous chapter, I paid attention to the intra-actions of the students, teachers, violins, music stands, cameras, and the traditions of violin playing when exploring the becoming of violinists. In this chapter, I re-turn to my interest in the productions of violin lessons, turning this topic over and over, allowing it to intra-act again and again (Barad, 2014) to find other insights on the phenomena of violin lessons. In this chapter, I pay attention to how the cultural and economic capital of the students, their families, and their communities, as well as the categories of race and gender, materializes in the lessons. Building on Barad's complex understanding of class as a dynamic topology of materialdiscursive practices, I read stories from violin lessons through intersectional feminism and through research on class in Norwegian society.

Although intersecting, the categories of race, gender, and class were not equally prominent in the lessons I observed. Class and how it was enacted and produced in the lessons glimmered (MacLure, 2013) and demanded my attention when I first engaged with the materializations from the lessons. Previous research on Western classical music (Bull, 2019) and SMPA (Berge et al., 2019; Jeppsson & Lindgren, 2018; Jordhus-Lier et al., 2021) also suggests that class is a structure that takes part in stratifying students' participation in music education. Thus, I start this chapter by reading the work of Barad (2007) on class and Ahmed's (2017) work on inter-sectional feminism through stories relating to the material and cultural capital that materialized in the lessons. This reading generates insight into how the lessons, although held in the same SMPA, were differentially classed. Then, I move on to how race and gender also intersected in the lessons. I end this chapter by telling stories relating to entering—or not entering—violin lessons and by reading them through Ahmed's (2017) insightful writings on diversity.

All though the chapter, I build on the concepts developed through the diffractive readings of stories from face-to-face and online lessons. The concept of a topological togetherness reworks questions of connectivities and boundaries, and it generates insight into how race, class, and gender are part of the boundary-making practices that create the spatial and temporal boundaries of the lessons. The concept of tentacular and agentic violins makes tangible how violins, like all matter, are not bounded and passive objects but entangled agencies that take part in the becoming of social, cultural, economic, and discursive categories.

The reading I offer in this chapter generates new insights into how violin students of SMPA are becoming in the intersections of race, gender, and class. As Haraway (1994) and Barad (2007) emphasize, we are a part of the world's becomings, and we must be response-able for

how our participation fosters some forms of life and not others. By offering insights into how race, gender, and class are working in constituting differential subjects in SMPA, I aim to create the possibility for a more response-able music education that is attentive to who is included in SMPA and to the possibilities and impossibilities for becoming that is offered.

Differentially Classed Lessons

Building on feminist theorists like Fernandes, Hennessy, and Wilson Gilmore, Barad writes that class must be understood "as a dynamic variable with integral cultural, ideological, and discursive dimensions" (Barad, 2007, p. 227). This understanding "does not diminish, but indeed is necessary to, a thoroughgoing analysis of economic capital in its materiality. Likewise, it is important to recognize the material dimensions of cultural economies" (p. 227). Barad's understanding of class as incorporating cultural, ideological, and discursive dimensions bears similarities to the ORDC model[141] that is widely used in research on class in Norway (Toft & Flemmen, 2019). As I wrote in Chapter 2, this model utilizes a vertical and a horizontal analysis of class based on Bourdieu's theories on different forms of capital, which posit that cultural capital might be used to gain economic capital and vice versa (Hansen et al., 2009). Although the ORDC model is firmly rooted in a humanist paradigm, I find Bourdieu's (1984/2010) understanding of cultural and economic capital to work well with Barad's posthumanism and their emphasis on the entanglement of matter and discourse.

In Barad's (2007) understanding of class, it is not an isolated or privileged category nor is it a trait of individual subjects. Thus, I do not trace a specific trajectory toward a fixed, classed subject in my reading of stories through theories on class. Rather, I explore the intra-acting dynamics of class and other categories and how they take part in differentially constituting subjectivities through material, discursive, temporal, spatial, and affective intra-actions. By doing so, I turn my attention to how the apparatus of bodily productions (Haraway, 1994) works. By making the apparatus's work tangible, possibilities for participating in the bodily productions that "foster some forms of life and not others" (Haraway, 1994, p. 63) are created.

I start this section by exploring the differentially classed communities that the lessons took place in. Although located in close proximity—if thinking of distance from a geometrical perspective—the schools where Marianne and Astrid taught were far from each other in terms of their classed positions, and I trace how class materialized in the neighborhoods, in school buildings, and in the intra-actions with parents and students. Then, I re-turn to the

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141   The Oslo Register Data Class Scheme (ORDC) model is presented in Chapter 2.

stories told in previous chapters, and I read these stories diffractively to investigate how the lessons—their spatial and temporal boundaries as well as the matter of the lessons—became in intra-acting with classed structures.

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Entering a Working-Class School

When I first entered the school where Marianne taught, I noticed that although the schoolyard was empty, it was not quiet. I could still hear the sounds of the city—voices, cars, a distant building site—as I walked through the gates and across the basketball court. Passing the rather crowded play area for smaller kids, I looked at the tall and old school building looming over the small schoolyard.

I opened the heavy front door and started climbing the staircase toward the music room on the top floor. The stone steps were worn down by years and years of students and teachers walking up them, dragging mud, stones, and dirt inside the building, and by the cleaning products and scrubbing of the cleaning staff.

Stopping for a moment at the door to the music room, I looked to the right and saw a couple of rows of mismatched chairs where chatting and smiling parents were seated. In front of me, the floor of the room was filled by groups of students with various instruments. Teachers moved between the groups, locating missing instruments, helping with sheet music and music stands, and chatting smilingly to students who looked nervous.

The spring sun came in through the large windows, covering one wall of the room and making it bright and warm. The sun revealed that a coat of white paint was all that had been done to the room in the last few decades.

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The old and worn-down school lies in a large Norwegian city. The worn-down stone steps, the small schoolyard filled with noise, the mismatched chairs, and the music room that had not been upgraded for years revealed the school's classed nature as one that would place it at the lower end of the vertical hierarchy within the ORDC model. Looking at the statistics of the area, I found out that the area where the school's students live has levels of income, education, and employment that are significantly lower than they are in the city as a whole.[142] Most people in Norway own the home they live in (Statistics Norway, 2019), but this area

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142   In this section, I refer to demographic facts of the neighborhoods without numbers and references in order to protect the anonymity of the teachers and students. The source of all numbers is the statistics made publicly available by Statistics Norway at https://www.ssb.no/en.

has a large percentage of rental apartments, many of them offered by social services, and the percentage of families living in crowded apartments is particularly high. Living in small and often-rented apartments creates a high mobility rate in the population as families move to better apartments if given the opportunity. Thus, a high percentage of the school's students change each year, and this makes it hard to establish a stable school community. The inhabitants of the area are working together with the government to improve their neighborhood, and one of the many projects aiming to do so is the orchestra project of the school.[143]

Through creating opportunities for students to learn an instrument, the project aims to foster pride, joy, and community, and to work toward achieving an understanding and mutual respect between different cultures.[144] Thinking with the ORDC model, one might see the school orchestra as an attempt to elevate the level of cultural capital for the students of the neighborhood because SMPA is associated with highbrow culture (Karlsen & Nielsen, 2021). Also, previous research reveals that immigrant parents might use music education as a tool for class remobility (Hofvander Trulsson, 2010). As stated earlier, different forms of capital are interchangeable. Thus, to be educated musically and to increase one's cultural capital could be seen as a strategy for moving upwards in the vertical class system.

In telling this story and by relating it to demographical statistics, I have storied the school of Marianne, Olivia, and Sarah as a working-class school and the orchestra they play in as a way of moving upwards in the class hierarchy. In the following story, I re-turn to the story of how I did not enter the door to the lessons when I first arrived to observe Astrid's lessons. This time, I tell it while thinking through the concept of class to story the school as a middle-class school.

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Entering a Middle-Class School

When the period of observing Astrid's lessons started, it was winter. As I started on the long bus drive across town, a surprisingly early first snowfall of the season made the traffic slow down. When the bus stopped in a neighborhood with large houses surrounded by gardens, I was running late. Walking through the snow, my feet moved quicker and quicker each time I checked Google maps; I had no time to take in the crisp, cool air, the quietness of the neighborhood, or the beautiful view of the city.

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143   The sources for this information are various news articles, and the Facebook page of the orchestra's web page and other local organizations working to improve the local community. I do not state these sources in order to protect the anonymity of the area and the teachers and students involved in the study.

144   The goals of the projects are found on its web page, but not referred to in order to protect the teachers' and students' anonymity.

I heard the sound of children playing in the snow before I saw the school. It was large, new-looking, and consisted of several buildings, some connected by corridors and others facing shared areas for playing. Luckily, the first entrance I found led me straight to the science classroom I was looking for. But the lesson had already started, and the door to the classroom was closed.

While waiting for the lesson to end, I looked around the corridor. It looked fresh and well kept, with tidy rows of empty pegs for hanging clothes. It was quiet, except for the sounds of music spilling out of the closed door. When the cleaner entered the classroom to mop the floors and empty the dustbin, the sound of the quartet playing became louder and then became muffled again as he left, closing the door behind him.

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The school where Astrid taught, the one I came to running through the snow, was located in the same city as the other school but in an area where the level of income, education, and employment are higher than the city average. The students in this neighborhood live in bigger-than-average apartments or houses, and the norm is to have more than one room per person in the household. Almost all families in this area own their own homes, and they are less likely to move than the average family. The number of inhabitants with an immigrant background is low. The demography bears the marks of being middle-class or even elite according to the ORDC model.

To organize a string orchestra like the one Nora played in—to arrange concerts, seminars, trips, and weekly rehearsals; to plan the budget and make sure the spending matches the income; to hold board meetings; to buy instruments; to make plans; to apply for funding; and to report on the activities done—is a demanding task. The level of resources in the form of time and competence, highly associated with economic and cultural capital, needed from the parental group to do all these things is hard to estimate. Marianne's lessons were also organized in a string orchestra, but there, most of the administration was done by the teachers and by the school staff as it was a community music-oriented project initiated by the municipality and the local SMPA, not the parents of the neighborhood.

The high level of capital in the community where Nora lives also materialized as I sat in the audience of the concert where the quartet would play, waiting for it to start. The middleclass-ness materialized in the quiet politeness of the audience. To not be too loud, too much, too enthusiastic is associated with white, middle-class culture (Bull, 2019). The cultural capital also materialized in the conversation I overheard among the parents about the newly published essay by one of them and the debate it sparked. The economic capital became audible in the

phone conversation of the dad at the next table who was trading with high amounts of money while waiting for the concert to start. These conversations, held with an air of being quite natural in a public setting, suggest that the level of capital in Noras's neighborhood is high.

According to Barad (2007), the intelligibility and materiality of class are becoming in intra-actions with particular materialdiscursive practices. The particular materialdiscursive practices that constituted the differentially classed nature of the two neighborhoods became tangible to me by the sounds of cars and building sites, by the quietness of the falling snow, by the different air qualities, by the spaces in which the children played—a spacious hill for playing in the snow versus a crowded school yard. It also became tangible through the materiality of the schools. Both schools are publicly funded from the same municipal budget, but the level of maintenance and the quality of the play areas suggest that their funding is differently aligned with their need for resources.

As the observations with Linda and Freya were done online and in a period of social lock-down, the organizations of these lessons materialized mostly as the length of the lessons. They were longer than the other students'—Freya's lessons were 60-minute lessons, not 20 or 30 minutes. But as the lessons were held in her home, other traces of class became tangible. One of those was her access to violins.

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An Abundance of Violins

"… violin. You know, but I wanted Mari to know as well. And then, you have, you have, you have …" Linda's voice rose suddenly before distorting into a faint echo.

"Oh no, I can hear my own voice. I hate that," Linda continued. "Okay. And then, you have two violins sized ¾. I guess you like one of them the best?"

"Yes …?" Freya's voice sounded undecided. Skype was blurring the room behind her making it impossible to guess where she was.

"Play the one you like the best in today's lesson."

"Well, there's something wrong with this one. I'll just take the other one".

"Have you tuned the violin?

"Yes, many times. But dad was working on them yesterday. He might not be finished fixing them." Freya plucked the strings to get an impression of the tuning before lifting the violin to tune it properly.

After the violin was tuned, Freya and Linda started working on scales and etudes before moving on to the Bériot piece. At the end of the lesson, I heard the voice of Freya's dad.

"I won't …" The voice trailed away in the stutter of Skype. Then: "Li-li-li-aaaa?"

"Did you say something, John?" Linda's voice was perfectly clear to me.

"Freya is having trouble deciding which violin to play." The dad's face appeared on my screen, and now the sound was stable again. "She says that the one that Anna used to play is the one with the best sound. I think that's the violin most similar to Freya's old violin. We have not decided yet."

"Are you thinking of selling one of them?" Linda asked.

"No, I don't think-ink-ink." Again, his voice was cut short by the stutter of Skype. This time, the brighter voice of Freya also blended in:

"No-o-o."

Then, the dad's voice was clear again. "It seems like it is difficult to sell violins, so the question is really which violin to play when practicing."

"Why not use both and develop some flexibility?" suggested Linda.

"That was my idea as well," said Freya, contentedly.

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Re-turning to how specific violins have a specific feel to them and to the story in which Marianne went to some length to make sure Olivia played on her customary violin, I interpret Linda's suggestion of alternating between two violins as an implication that Freya's capacity for learning is large enough to add yet another aspect. This is not an individual capacity, but a capacity becoming through intra-actions. The two violins, through reading the previous story with social class theory, become a materialization of the abundance of support Freya seems to benefit from that, in turn, enhances her capacity for learning. Reading the story through the concepts of economic and cultural capital makes some of this support visible.

The amount of economic capital invested in Freya's musical education is large. She plays in an expensive string orchestra where the yearly membership fee is about 6,000 NOK.[145] Her string orchestra is organized by parents in collaboration with the local SMPA. The string orchestra buys hours of tutoring from SMPA and supplements with additional student fees. Thus, the string orchestra members, like Freya, get substantially longer lessons than SMPA students. They also have additional orchestra rehearsals, seminars, concerts, and trips not commonly offered to SMPA students. During the lessons, the topic of summer courses came up as Freya prepared the repertoire to be played. At string summer courses, the students typically stay at a boarding school or youth hostel for a week while playing in orchestras and chamber music groups, in addition to having individual lessons. The price range for these courses is about

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145   Approximately 580 EUR or 570 USD in October 2022. The source for this information is the orchestra's website. In order to protect the anonymity of the teachers and students, I do not refer to it.

4,000–6,500 NOK.[146] Young children up to the age of 11 have to be accompanied by a guardian who pays a slightly lower fee. Thus, the yearly costs of Freya's violin lessons and orchestra rehearsals are at least 10,000 NOK.[147]

The economic capital of Freya's family also materialized through the violins available to her. The other students in this study play on instruments borrowed or rented for a small fee from their orchestras. Freya does not own only one, but two, violins. And it materialized in the sheet music she played, as she was the only student not exclusively playing from photocopies made by the teachers.

Not only the economic capital, but also the cultural capital of Freya's family materialized through the violins she played. The reference to her father working on them suggests that he has some kind of knowledge of instruments. Another way the cultural capital of the family took part in the lessons was through references to Freya´s mother and their daily practice sessions. Freya´s mother must have had, or gained, a good knowledge of music and violin playing through engaging with Freya´s playing for six years. The support Freya receives in learning to play the violin also takes the form of her punctual and reliable attendance at the lessons. Taking her young age into account, I assume that her parents take part in making sure she arrives at the lessons on time.

Through the stories told and the reading of them through the concept of social class, patterns of differentially classed lessons have emerged. Before relating these to race and gender, I will discuss how differentially classed lessons offer im/possibilities in becoming violinist.

Differentially Classed Im/possibilities for Becoming Violinists

In Barad's reading of Fernandes's (1997) work, Fernandes reworks Foucault's analysis of power and creates opportunities to rethink the nature and dynamics of structural relations. Through this reworking, structures become productive of subjectivities and produced through the practice of subject formation. In other words, structures—like class structures—are apparatuses that contribute to the production of phenomena, and they are themselves materialdiscursive phenomena that are produced through the intra-actions of specific apparatuses. "Structures are specific material configurations/(re)configurations of the world" (Barad, 2007, p. 237).

Thus, structures are not either an external force or a product. Structures are an integral part of the phenomenon in question. In terms of violin lessons and class structures, class then

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146   Approximately 390–625 EUR or 380–620 USD in October 2022.

147   Approximately 960 EUR or 960 USD in October 2022.

becomes a structure working on violin lessons, creating differentially classed lessons, and it becomes a structure produced through the materialdiscursive practices of violin lessons. In the following section, I point to some ways that class is working on lessons in creating their spatial and temporal boundaries. Then, I discuss how the lessons produce differential im/possibilities for becoming violin-playing subjects.

Economic capital takes part in the intra-action creating temporal boundaries of the lessons through how much time the teacher has allocated to each student, but also through what this time is spent on. As told in the stories from Marianne's lessons, a substantial amount of the time Marianne had for each student was spent locating students and violins. This also happened in Astrid's lessons, although not as frequently. Marianne also spent a noticeably larger amount of her time tuning and doing easy maintenance on the violins than the other teachers did. Although not comparable to face-to-face lessons, the online lessons Linda held, with the exception of the lessons where a spider scared Freya, were characterized by being three times the length of the other lessons and by spending almost all of the time playing or talking about playing.

Economic capital also takes place in creating the temporal boundaries of the lessons through the school buildings. By being old, worn down, and having the sounds of playing children and flushing toilets leaking in, the school where Marianne teaches offered fewer possibilities for concentration and dedication than Astrid's school. I attended a concert played by each of their students. Marianne's students played in their music room, a room that was worn down and small, while Astrid's students played in a hall well suited for concerts with a beautiful stage and a spacious area for the audience. These rooms also offered different im/possibilities for becoming violinists.

The level of different forms of capital might be described as the level of support for learning to play that the students receive. This support is not restricted to the teachers; it also involves the parents and the communities of the students. During an intra-view, Marianne told me how she preferred not to use stickers and to let the students learn to place their fingers by ear only. But, she added, that this approach requires more time with the students and more support from the parents than is available at the school where she teaches Olivia and Sarah. This is an example of how teachers adjust their expectations and ambitions to the particular students and their situations.

Thinking with Barad's notion of subjectivities as differentially constituted through intra-actions (Barad, 2007) means that these differences cannot be attributed to the individual traits of the students or their parents. Rather, the differences are produced through intra-actions that

include class structures. These differential becomings of the spatial and temporal boundaries of the lessons, as well as the differences in economic and cultural capital spent on the students' music education, create differentially classed im/possibilities for becoming violinists. As I will demonstrate in the stories to follow, engaging with the intersection of race and class, I made racist and classist assumptions about the levels of education of the parents I approached. It seems likely that I, as well as other teachers, might make similar assumptions when teaching. Thus, middle-class students might be met with higher expectations than other students. In the following section, I explore some of the ways race and class intersected in the lessons.

Differentially Raced Lessons

In Norway, many consider race a taboo word that upholds racism (Bangstad, 2015), and race is often silenced and elided with concepts such as culture, ethnicity, and biology in contemporary debates and research on education (Eriksen, 2020; Harlap & Riese, 2021). Nevertheless, I find the concept of race to be generative in exploring the differential becomings of violinists. In the following section, I read stories diffractively through Ahmed's (2017) work on the intersections of race, gender, and class. To intersect is not simply to add one category on top of the other; it is to work together, and in the following section, I explore the workings of race and class by re-turning to the story in which I sat outside the door of Nora's quartet rehearsal.

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White and Middle-Class

A couple of minutes before the rehearsal came to an end, a mother and the student's younger sibling came to pick up one of the students. I introduced myself and gave the mother a consent form that she signed after quickly skimming it. She seemed intrigued, but not surprised, by my presence as she had been informed about my project by both me and Astrid beforehand. The mother wanted to know more about my research project and where I was doing it, and we chatted for a bit.

Then, the door opened, and the students walked quietly out carrying their instruments and ring binders with sheet music.

"Nora! There you are," the mother said with a smile. "We are late for your ski training. Did you get all your stuff? Let's hurry."

The family left, with the youngest sibling almost running to keep up. They looked like a poster Norwegian family dressed in their expensive—but very practical and not flashy at all—skiing costumes. Tall, blond, and healthy, the family carried their skis on their shoulders.

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Although it might be an image held by others, most Norwegians do not go skiing as a weekly activity. It is one of the more expensive sports to participate in with an average cost of about 5,000 NOK[148] a year in the cities (Oslo Economics, 2020). In addition to requiring expensive equipment, the activity requires access to transport and space for the storage of skis, ski poles, boots and clothes; many skiing enthusiasts also have their own table for waxing the skis, although this is not a prohibitive requirement. And it requires an identity as someone that goes skiing. To be Norwegian and to go skiing is so closely connected that there is a Norwegian proverb that says that Norwegians are born with skis on their feet. To be Norwegian is also, by many, considered synonymous with being white (Harlap & Riese, 2021). Thus, Nora's leisure activity suggests that she belongs to a white, middle-class family.

The middle-class-ness of Nora's family also materialized in my conversation with her mother and my assumption, even before the mother started speaking, that she would be comfortable discussing my research. In some situations, like in the following story of when I met Sarah's dad, I feel self-conscious when presenting myself as a researcher, and I constantly consider simplifying the way I present my research. With Nora's mother, I assumed that would not be an issue as I, automatically and subconsciously, presumed she had a higher education and spoke Norwegian as her mother tongue. This is a racist and classist assumption. But I had it, and I continue to have similar classist and racist thoughts with me as I write. Making them visible and being accountable for what they do is the only way to move away from letting them remain unnoticed and form my research. As I approached Sarah's father after the concert, asking him to consent to Sarah's participation in my project, the categories of race and class intersected in how I approached him.

Black and Working-Class

I found a seat close to the door and recognized Marianne, a white woman in her forties. She was moving smilingly between her violin students, her brown ponytail dancing, making sure they had their sheet music and instruments ready. The students had a wide range of different skin colors and hair colors, some of them wearing hijab. As Marianne turned toward the audience, we made eye contact, but she was too busy to come talk to me.

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148   Approximately 480 EUR or 480 USD in October 2022.

I waited until the concert ended before asking Marianne to point me toward the parents of the students she had suggested I observe lessons with. Sarah's father was tall, slim, and Black. I watched him chatting to another father in a language that I didn't understand,[149] waiting for him to be ready for me to approach him.

I always feel self-conscious when approaching new people. I guess most people do. But I felt particularly self-conscious when approaching someone as a researcher with a dialect not easily understood by those who have learned Norwegian as a second language. When talking of everyday matters, it usually works out fine. I have to adjust my wording a bit but not too much. But what about when talking about consent forms, observations, and other not-so-common things? Asking Olivia's father two minutes earlier had been no problem, but then, he had sounded and looked like Norwegian was his mother tongue. I had not yet decided how to phrase my question to Sarah's father when he turned toward me.

"What an interesting project," the father said after I had introduced myself. He quickly skimmed the information letter accompanying the consent form. "I would prefer Sarah not to be filmed. Would you still be interested in observing her lessons if you were only to audio record them?"

"Yes, I would. Please tick the boxes of what you are consenting to do, and I will keep it at that," I said and gave myself a brief reminder to unpack my racist assumptions yet again.

• • •

In approaching Sarah's father, I made assumptions about his level of education and his mastery of the Norwegian language based on his skin color, his ability to speak a language other than Norwegian, and the fact that he lives in a working-class neighborhood. Race and class intersected making me question whether or not he would understand what I was asking him to consent to. I had no such hesitations with Nora's mother, as I assumed her middle-class-ness and Norwegian-ness, or with Olivia's father who, although living in a working-class neighborhood, was white, and, thus, I assumed he would understand me. This highlights how social structures are not isolated but intersecting (Ahmed, 2017). It also highlights how I subconsciously meet different people with different expectations, and, thus, take part in creating different im/possibilities for becoming. I continue this exploration of differential becomings in the intersections of race, gender, and class by turning to the role gender played in the lessons.

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149   I recognized the language as the mother tongue of one of the larger immigrant groups of Norway. In order to protect Sarah's anonymity, I do not name it.

Differentially Gendered Lessons

In the sections above, I have told stories that, read through intersectional feminism and theories on class, have generated insight into how race and class are structures that create im/possibilities for becoming violinists. As this is a feminist dissertation, building on feminist new materialist and posthuman theories, I would expect it to be easy to write stories suitable for exploring how gender also takes part in the enactments of violin lessons. But, as it turned out, it was not.

In the lessons I observed and that materialized as audio recordings, transcripts, field notes, and diary entries, there were stories relating to class and race that glimmered and demanded my attention. But this did not happen so readily in relation to gender. This could be due to my lack of attention or imagination. It could also be due to how the glimmer, in the stories related to race and class, was often created in events where these categories were contested or where they became in contrasting ways.

Violin lessons in SMPA is a domain almost exclusively inhabited by girls and women. There are male violin teachers, but although not documented by research, the number of female teachers is far greater. Research on SMPA students shows that the schools have distinct gendered patterns of participation where instruments, genres, and activities are dominated by either girls or boys (e.g., Berge et al., 2019; Blix & Ellefsen, 2021), and violin is one of the instruments that is mostly played by girls (Kjøk, 2008). In the lessons I observed, the dominant position of girls and women was not contested while the dominance of white middle-class students in SMPA (Jeppsson & Lindgren, 2018; Karlsen & Nielsen, 2021) became tangible through it being contested and challenged.

But gender has been working in other parts of this dissertation. In Chapter 2, I conveyed how the working conditions of SMPA teachers, who often work at different locations and in the evenings, were difficult to combine with being a wife and a mother. The wish for an easier life was part of my reason for applying for a PhD fellowship. In Chapter 8, I explored the strings of my violin by tracing the three men responsible for the naming of it. I found that, of the presumably many female students of the violin professor Alard, I could only trace three in the literature available to me. They all showed great promise as children, but their careers ended by marriage or an early death.

How are the im/possibilities for becoming violinists in present Norwegian SMPA intra-acting with the category of gender? To the best of my knowledge, there is no research on this question. Based on my experiences and on my exploration of the strings of violin-playing traditions,

as well as recent accounts of (Larsen & Lie, 2017; Lindø, 2018) and research on (Røyseng, 2021) sexual harassment in higher music education, I find it likely that there are gendered structures creating im/possibilities for becoming violinists at work. But these patterns did not emerge in ways tangible for me this inquiry.

Entering Different Lessons

Through telling stories from violin lessons and reading them diffractively through theories of race, class, and gender, I have made tangible how structures of race, class, and gender are part of the productions of violin lessons, and how these structures are produced through violin lessons. The lessons and the structures are differentially becoming in space, time, and matter and "questions of space, time, and matter are intimately connected, indeed entangled, with questions of justice" (Barad, 2007, p. 236). I find this to be particularly important in the readings of the stories and in paying attention to how they produce im/possibilities for becoming violinists.

Although being enacted in a troubled space—in a multiple space of online meeting rooms, bedrooms, and home offices, or in classrooms with porous boundaries and opening and closing doors—violin lessons happen in a space, and entering the lessons requires entering this space. But as the reading done above showed, students enter different lessons. In the following section, I think through Ahmed's (2017) writings on diversity work in academic institutions when re-turning to the stories where students and others entered the space of the lessons.

Bull's (2019) study of classical music practices in England shows a strong identification with white, middle-class norms and values including bodily practices of control and restraint. Although I have found no other studies observing SMPA practices in Norway, analysis of policy documents suggests that the norms and values of Western classical music are influential in SMPA as well (Berge et al., 2019; Jordhus-Lier et al., 2021; Karlsen & Nielsen, 2021). Norms are important considerations when one enters spaces. Ahmed (2017) likens norms to rooms or dwellings, as something that gives residence to bodies, that we pass through. If we fit the norm, we pass unnoticed. But some of us are stopped and questioned. Ahmed points to how the question of "where are you from?" implies that the person being asked is not from here, not fitting the norm. What, then, if someone enters a room not only without being questioned but also without being noticed?

The first time I went to a rehearsal with the string quartet Nora played in, I arrived too late due to an unexpected snowfall. Therefore, I sat and listened to the remaining rehearsal from outside the door. Only when the cleaner entered, without knocking, did I hear their playing properly. The next rehearsal, Astrid welcomed me, but Nora shut the door on me before I could enter. I felt confident enough to enter anyways, and Astrid greeted me with a smile. The cleaner entered the room to this rehearsal as well. He did not knock, and he did not greet us. Nor did we greet him. He entered the room through the door unquestioned. But he did not enter the violin lesson. Ahmed (2017) writes that a "door is not just a physical thing that swings on hinges, but a mechanism that enables an opening and closing. Some have to pass when this mechanism is working" (p. 220). In this sense, the door entered by the cleaner did not open into a violin lesson but into a classroom in need of cleaning. When I entered, on the other hand, it was a door to a violin lesson.

Through grappling with this story, it becomes tangible how doors and spaces are constituted by materialdiscursive structures. One of these structures is class. Being a cleaner constituted the man who entered the room as working-class. His classed position also intersected with race—the cleaner was the only racialized person I saw at Astrid's lessons—and gender—he was the only male except for some dads picking up their children. To be a person in the intersections of being brown, male, and working-class made the room he entered not the room of a violin lesson.

Norms can also be about who feels comfortable and whose work is required for the feeling of comfort (Ahmed, 2017). In the lessons I observed, Sarah was the only racialized student. In being so, Sarah did, whether she wanted to or not, diversity work. Ahmed writes that we "embody diversity by appearing in a way that is inconsistent with the norms of an institution" (p. 125). By being racialized in a predominantly white institution, Sarah embodied diversity. There are no indications that Sarah intended to do diversity work, or that she even noticed that she did so, but thinking through Ahmed's intersectional feminist lens, she did.[150]

Ahmed (2017) likens institutions to garments saying that institutions, like garments, tend to take the shape of those who wear it. To be fitted within an institution, to have its structures fit your body and your values and the practicalities of your everyday life, is a privilege and to try to fit into something that does not fit is hard work (Ahmed, 2017). Fitting in music education is hard work anyway, but to do this hard work might be a possibility offered only to some students and not all.

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150   That is not to say that Sarah did not notice either. From other violin students in other situations, I have heard comments suggesting that they are well aware of the norms of whiteness in violin playing and of how they do not fit them.

In this chapter, I have read stories from violin lessons diffractively through intersectional feminism and research on class in Norwegian society as well as Barad's complex understanding of class as a dynamic topology of materialdiscursive practices (Barad, 2007). Through this reading, I have generated new insights into how violin students of SMPA are becoming in the intersections of race, gender, and class. I have also shown how race, gender, and class are structures constitutive of the phenomena of violin lessons as well as produced through the lessons. In the following interlude, I bring these insights together with the insights into the becomings of violinists generated in Chapter 10, and I suggest the concept of differential violinists.

Interlude IV: Differential Becomings

In "Chapter 10: Becoming Violinists" and "Chapter 11: Becoming in the Intersections of Race, Gender, and Class", I have read stories from violin lessons diffractively through agential realism, affect theory, intersectional feminism, and Sámi onto-epistemologies to generate insight into how violinists are becoming and what they are becoming. Taking the agential realist notion of a subjectivity differentially constituted through intra-actions as a starting point, I have explored the cultural, ideological, and discursive, as well as material, economic, and affective, aspects of violin lessons and how they take part in the becoming of violinists. Through the reading, a pattern of different im/possibilities have emerged. Some of the students of the lessons are offered the possibility of becoming professional violinists while this is not a possibility emerging through other lessons.

I conceptualize these becomings of violinists as *differential becomings*. The differential becomings are created in the intersections of race, gender, and class, and they are also connected to the dominant norms of being an able-bodied adult. In line with the agential realist notion of agency as not aligned with human intentionality, these differential becomings can not be said to be intentional. There are no indications in my study that they are planned for or intended by the humans involved in the lessons. Nevertheless, the im/possibilities offered to the students are connected to their placement in stratified structures of race, class, and gender. By generating insight into how this comes into being, I aim to make music education more response-able for our part in the production of those structures and more capable of fostering more just forms of life (Haraway, 1994).

Chapter 12: Knots of Knowing-in-Playing That Matter

The diffractive reading of stories from violin lessons in the previous chapters have generated the concepts of *topological togetherness, tentacular and agentic violins,* and *differential becomings.* These concepts are apparatuses or boundary-making practices; they enact agential cuts useful for generating insight into the phenomena of violin lessons and into their multiple enactments and productions. In that sense, the concepts—although not taking the form I anticipated—answer the question I initially asked: *How are violin lessons enacted and what do they produce*?

As I wrote in "Interlude I", I imagined the answers to the question I posed to form some sort of categories, that, although not fixed, would group the answers together based on similarities. Instead, what emerged was the fourth and last concept I propose: *knots of knowing-in-playing.* In the following section, I present the concept of knots of knowing-in-playing, and I relate this concept to the ethico-onto-epistemological stories of Turi (1910/2012). Then, I re-turn to the moves for music education research I suggested in Chapter 2 and to how I have conducted this inquiry, and how it might have/will become otherwise.

Knots of Knowing-in-Playing

The term knots of knowing-in-playing is a playful and diffractive reading of Barad's and Haraway's words through one another.

> We do not obtain knowledge by standing outside of the world; we know because "we" are of the world. We are part of the world in its differential becoming. The separation of epistemology from ontology is a reverberation of a metaphysics that assumes an inherent difference between human and nonhuman, subject and object, mind and body, matter and discourse. *Onto-epistem-ology*—the study of *practices of knowing in being* [emphasis added]—is probably a better way to think about the kind of understandings that are needed to come to terms with how specific intra-actions matter. (Barad, 2007, p. 185, emphasis in original)

> It matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; *it matters what knots knot knots* [emphasis added], what thoughts think thoughts, what descriptions describe descriptions, what ties

tie ties. It matters what stories make worlds, what worlds make stories. (Haraway, 2016, p. 12)

By thinking of Barad's *practices of knowing in being* through Haraways's *knots,*[151] it becomes possible to grapple with the entanglements of knowing and being. The figuration of knots allows me to keep in mind how each knot forms a figuration—a string figure—while also being connected to other knots. By adding hyphens, the entanglement of knowing and being is emphasized. And by replacing "being" with "playing," the specificity of the practice of violin playing becomes visible. Thus, I conceptualize the knowing, playing, learning, teaching, and being of violin lessons as knots of knowing-in-being.

Rather than turning our attention toward similarities and differences, like categories do, knots turn our attention toward connectivities, toward a topological understanding of violin playing, and toward how the becoming spatial and temporal boundaries of violin lessons enable a topological togetherness. Knots also turn our attention toward the way violins, as well as all other material figurations, are agentic and connected in tentacular ways to the world. Thinking through the concept of knots makes it possible to trace these strings while also staying with the figuration they make as knots or string figures in themselves (Haraway, 1994, 2016). Knots also allow for being mindful of the differential becomings of violin lessons. As Haraway writes, string figures are the "passing on and receiving, making and unmaking, picking up threads and dropping them" (Haraway, 2016, p. 3). This relational and performative doing resonates with the relational and performative enactments of violin lessons.

Although the term knots of knowing-in-being came into being by diffracting the words of Barad and Haraway through one another, the idea of how stories might form knots of knowing-in-playing is very much influenced by Turi's (1910/2012) book and the scholars who have engaged with it (e.g., DuBois, 2011; Storfjell, 2011; Svonni, 2011). Turi introduces his book by these words: "I am a Sámi who has done all sorts of Sámi work and I know all about Sámi conditions" (Turi, 1910/2012, p. 11). In Chapter 4, I explored how the stories he tells are ethico-onto-epistemological stories of entangled ethics, knowing, and being. In Turi's stories, knowledge is performed in entanglements with land, place, animals, spirits, traditions, and communities. In the introduction, Turi also establishes how Sámi people's intelligibility—their ability to explain Sámi conditions to the Swedish government—is contingent on their being. When closed up in a room, their thoughts cannot flow but, Turi continues, "if there were a meeting place on some high mountain, then a Sámi could make his own affairs quite plain" (p. 11). My attempts to grapple with the entanglement of ethics, knowing, and being in violin lessons are inspired by Turi's writing and the writings of other Sámi scholars

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151   I could have used the term string figures as well, but I enjoy the rhythm and sound of "knots of knowing-in-being."

who work with the entanglement of stories, music, and knowledge (e.g., Finbog, 2020; H. Guttorm et al., 2019, 2021; Kramvig & Flemmen, 2019; Somby, 1994). I have tried to write stories that include not only humans but also music, space, time, and matter, and I have tried to read them through theory as well as by mobilizing my professional knowledge as I am a violin teacher that has done all sorts of violin work and know all about violin teaching, learning, and playing conditions.[152]

Turi writes with an authority conditioned by his lived experience embedded in knowledge and by his Sámi understanding of the world that could, in agential realist terms, be named ethico-onto-epistemology. The entanglements of ethics, knowing, and being are crucial to Sámi worldviews and run through all of Turi´s stories. It is also crucial in agential realism. In their article "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," Barad writes on how we know because we are *of* the world, and they end the article stating that "*onto-epistem-ology*—the study of practices of knowing in being—is probably a better way to think about the kind of understandings that are needed to come to terms with how specific intra-actions matter (Barad, 2003, p. 829, emphasis in original).

When their book *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* was published four years later, a slight rewritten version of the article quoted above formed Chapter 4. After the final sentence of the article, a new sentence had been added in the chapter:

> Or, for that matter, what we need is something like an *ethico-onto-epistem-ology*—an appreciation of the intertwining of ethics, knowing, and being—since each intra-action matters, since the possibilities for what the world may become call out in the pause that precedes each breath before a moment comes into being and the world is remade again, because the becoming of the world is a deeply ethical matter. (Barad, 2007, p. 185, emphasis in original)

The intertwinings of ethics, knowing, and being have guided the inquiry and the writing of this dissertation. But as the past is never left behind once and for all, I—and maybe also Barad—am influenced by the humanist tradition of separating questions of ethics from other questions, sometimes even as an afterthought added in the last sentence. Keeping this in

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152   Here, my researcher subjectivity, the one trained to question and make reserved claims, protests. I most certainly do not know all about anything! Nevertheless, I let the statement remain in the main text and confine my disclaimer to this footnote. All knowledge is situated and partial (Haraway, 1988). But I do have an extensive body—literally and figuratively—of knowledge related to violin playing and teaching to draw on when doing research. This body of knowledge has helped me relate to the bodily and affective aspects of the lessons I observed and to be mindful of the specificity of the entanglements.

mind, this last part of the last chapter of the dissertation is dedicated to a re-turn to the moves in music education research I suggested in Chapter 2 and to a re-turn to the inquiry done.

Feminist New Materialist and Posthuman Music Education Research

In Chapter 2, I read the body of literature on SMPA in Norway through the feminist new materialist and posthumanist education research of scholars associated with the international network of PhEMaterialisms. Based on this reading, I suggested three moves made possible in the intersection of feminist new materialist and posthuman theories and music education: toward an interest in the matter and doings of music education; toward more response-ability for what music education produces; and toward an understanding of knowledge as performative and relational knowing-in-being.

In Chapter 3, I asked what more agential realism might become when read through affect theory, intersectional feminism, and Indigenous and Sámi onto-epistemologies. I anticipated that affect theory would offer a broader understanding of the forces working on and between human and nonhuman bodies, that intersectional feminism would offer a broader understanding of the workings of social and material categories, and that Indigenous and Sámi studies would offer a broader understanding of the entanglement of knowing and being.

In the following section, I re-turn to the moves and expansions of Chapters 2 and 3 and I relate them to the diffractive reading I have done.

Toward Matter and Doings

In Chapter 2, I referred to music education research that centers humans in unquestioning (Jorgensen, 2015) or more nuanced (Richerme, 2020) ways. I identified a tendency to interview or administer surveys to adults in their capacity as leaders (e.g., Jordhus-Lier et al., 2021) and teachers (e.g., Nielsen et al., 2022) and to a keen interest in the curriculum framework of SMPA (e.g., Ellefsen & Karlsen, 2020; Karlsen & Nielsen, 2021; Letnes, 2020; Vinge & Westby, 2021).

Through the concept of topological togetherness, I have generated possibilities for exploring how space and time are becoming in intra-actions rather than merely being prerequisites for the lessons. Affect theory, Le Guin's carrier bag theory of fiction, and the Sámi concepts of oktavuohta and Siida worked together with agential realism to create insights into how

togetherness is becoming in a topology of space and time. Through the concept of tentacular and agentic violins, a concept that emerged by reading stories through agential realism and through the Sámi knowledge system of duodji, I have generated possibilities for exploring the agency of the matter of violin lessons. Together, these concepts offer possibilities for doing research that decenters the humanist subject and that turns our attention toward matter and doings.

This move holds the potential of doing research that supplements the research centered on policy documents and transcripts of the words of adults. In this dissertation, this potential has materialized in stories that center the strings, stickers, students, and spiders of violin lessons. Inspired by research associated with PhEMaterialisms (e.g., Osgood & de Rijke, in press), I have, in particular, tried to be mindful of the students' intra-actions with the humans and nonhumans in the lessons. I hope that this will inspire future music education research, as well as policies building on this research, to become even more relevant to music education practices.

Toward More Response-Ability

Although being an unquestioned value in music education (Kallio et al., 2021), diversity is a complex and undefined term (Ellefsen & Karlsen, 2020). In Chapter 2, I argued that music education research on diversity and questions of social justice are anthropocentric (e.g., Benedict et al., 2015; Jorgensen, 2015). This also includes research that takes a complex understanding of subjectivity as a starting point (e.g., Kallio, 2021; Lewis & Christophersen, 2021). Research concerning diversity is often aimed at identifying discourses in policy documents (e.g., Ellefsen & Karlsen, 2020), groups of children that are excluded from SMPA (e.g., Berge et al., 2019; Gustavsen & Hjelmbrekke, 2009), and projects that aim to include those groups (e.g., Kuuse et al., 2016; Lindgren et al., 2016). The move toward matter and doings made possible by feminist new materialist and posthuman theories generates possibilities for other ways to approach questions of diversity and social justice.

By reading stories from violin lessons through intersectional feminism and the agential realist concept of class, the concept of differential becomings emerged. This concept turns our attention to the becomings of music education and to how the im/possibilities for becoming are created in the intersections of categories such as race, gender, and class. Taking the specificities of the entanglements at hand as a starting point—the matter and the doings—the concept of differential becomings generates insights into the productions of music education. As agency—the capacity to take part in these productions—is not contingent on intentionality, it becomes possible to turn our attention away from discussions of intentions and toward

productions. This might be a supplement to the research pointing out the discrepancy between the intentions and practices relating to diversity in SMPA (Ulrichsen et al., 2021). The concept might be part of a move toward more response-ability for what music education produce and how these productions matter.

Toward Knowing-in-Being

The dominant conception of knowledge in music education is that of knowledge as constructed in and through social processes and represented as discourses or other cultural expressions by human subjects (e.g., Karlsen & Nielsen, 2021; Sandberg-Jurström et al., 2021). This conception of knowledge relies on a separation of ontology and epistemology (Barad, 2007). The concept of knots of knowing-in-playing offers possibilities for conducting research that takes the entanglements of knowing and being into account. By not separating questions of ethics, ontology, and epistemology, it becomes possible to be attentive to how playing is a practice deeply embedded in all of these aspects. The stories of Turi (1910/2012), and especially the stories concerning joik, serve as examples of how this might be done.

The concept of knowing-in-playing also holds the potential for moving beyond the binary of research on one hand and practice on the other. By taking into account how "*practices of knowing are specific material engagements*" (Barad, 2007, p. 91, emphasis in original) and *"theorizing, like experimenting, is a material practice"* (p. 55, emphasis in orignal) it becomes possible to think of research and practice as entangled.

Music Education Research That Matters

When I have told other researchers about my inquiry, they have asked what implications for practice or policy work my research has. I have had no idea what to answer. From other teachers, in particular those working with equipping children with skills such as reading and writing, I have not so much received questions as looks. Well-deserved looks, I might add. Although I consider music—and in a wider sense culture—to be vital for creating a livable future for all of us on the planet, I recognize the difference in immediate usefulness and for future prospects of financial independence between being able to play the violin and being able to read. But how, then, does music education research, and in particular the feminist new materialist and posthuman music education that I engage with, matter?

It matters for future music education research as well as policies building on this research by developing insights that are even more relevant to music education practices than humanist research are able to produce. Feminist new materialist and posthuman theories turn our attention toward "the particularities of the entanglements at hand" (Barad, 2007, p. 74). By doing so, it becomes possible to understand how worlds come into being and "to foster some forms of life and not others" (Haraway, 1994, p. 62). In the following section, I ponder three of the ways this might be done.

Feminist new materialist and posthuman music education might matter in research and policy by generating questions that are more closely connected to the practices of music education. In the inquiry I have done, the space, time, and matter of violin lessons emerged as important aspects, but in my reading of SMPA-related research, I found a lack of research relating to them. Nor is it a topic in the curriculum as there are no concrete indications of how many lessons students should receive, how long lessons should be, or how students' access to instruments should be organized and executed except for the statement that high quality performances require high quality instruments (The Norwegian Council for Schools of Music and Performing Arts, 2016). The lack of specific policies on the space, time, and matter of SMPA lessons could be intentional, but it could also be a result of the lack of research done on these aspects of the schools' practices.

Another way that feminist new materialist and posthuman music education might matter, is in the way that policy documents conceptualize knowledge. In the curriculum framework, knowledge is articulated through learning goals and developmental stages (The Norwegian Council for Schools of Music and Performing Arts, 2016). However, in the lessons I observed, the learning, teaching, and playing were becoming through intra-actions with humans and nonhumans, not neat and predefined goals and human intentions. By doing research that is more attuned to the messy becomings of music education, we might generate insights that, in turn, could become curriculums and policy documents that teachers and students find relevant and useful.

Feminist new materialist and posthuman music education research might also matter in teacher education by training future teachers to be attentive to the particularities of the entanglements at hand. A diffractive, rather than a reflexive, approach to teaching might be more suitable for teachers navigating complex and demanding situations (Lambert, 2021). By engaging with literature that explores the mundane and complex everyday practices of educational practices, teacher students might improve their ability to navigate complex practices. In this aspect, the posthuman attention to matter is of particular interest. As I made tangible through the stories, the agency of matter takes part in shaping the activities done. By reading about how

other teachers relate to this material agency in a considerate and mindful way—like Marianne does with the stickers—teacher students might find ways of their own to do the same rather than considering material agency as an unwanted and stressful interruption.

The third way feminist new materialist and posthuman music education might matter is through generating insights into the ways the intersections of race, class, and gender work in not only excluding students from participating in SMPA but also in stratifying the im/possibilities students are offered within SMPA. There is research warning against a situation in which students included into the Breadth program are excluded from the Core and Depth programs (Ellefsen & Karlsen, 2020). By investigating how this might come into being, the possibilities for changing SMPA to better fulfill the vision of being for all are enhanced.

Re-Turning to the Inquiry and to the Spider

Barad writes that diffractive reading might be understood as a form of affirmative engagement attuned to work constructively and deconstructively—but not destructively—to make new patterns of understanding becoming. "Diffraction is an iterative practice of intra-actively reworking and being reworked by patterns of mattering" (Barad, 2014, pp. 186–187, footnote 63). Iterative processes have no end, and, thus, I do not offer answers of how violin lessons are enacted and what they produce. Rather, I offer concepts that work in this dissertation and that might work in future research. Although I do believe I have made a valuable contribution toward music education research through conducting this inquiry, there is still more constructive and deconstructive work to be done in the iterative becoming of music education. Doctoral dissertations, on the other hand, are not iterative,[153] and the dissertation you have read is about to reach its end. But, thinking through agential realism, the relation of this inquiry and the next inquiry is one of dis/continuity.

In doing this/the next inquiry otherwise, I would have/will aim for more material engagement and entanglement with participating teachers and students. I might join in on the teachers as they make the room ready (would I be of help or hindrance?) and ask them to explain the way they intra-act with the furniture. I might participate in the lessons, asking questions and playing along, or teach the student and then have the teacher comment on my teaching and suggest other ways to do it. Or I might take part in the maintenance and sorting of instruments in between lessons.

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153   For that, I think we are all grateful. I would also like to add that I am most grateful that you read all the way until this not-concluding section.

I also would have/will pay more attention to the porous temporal and spatial boundaries of lessons. I might ask to join in on the students' home practices, not only letting them practice while I watch but also letting them explain to me how they practice and why or letting them instruct me on how I should be practicing. I might join the teachers as they prepare and evaluate the lessons, as they read their notes, looking for the next song to play, and as they discuss issues with their colleagues. I might join the students and teachers as they move to the lessons, from homes and after school programs, and back again, or I might stay in the corridor paying attention to who is not taking part in the lessons.

And I would have/will be a different researcher—braver, more outrageous, more experimental, more provocative, more playful—telling bolder and braver stories. "It matters what stories make worlds, what worlds make stories" (Haraway, 2016, p. 12). For us, living in the Anthropocene, "there is no alternative but to find new and different responses, if 'we'—humans and other-than-humans—are all to thrive" (Chappell, 2022, p. 496). I would have/will be braver in searching for different ways to be response-able in the stories and worlds to come.

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Playing With a Spider: Part 5

The paths of Linda and I crossed a couple of weeks before I handed in the dissertation as we found ourselves moving chairs before a concert.

"You know that story of the spider?" she said in a quiet moment when we were not overheard. "I had forgotten all about it, but it is a really cute story. I tried to calm Freya down. I actually think I handled that quite well."

"I'm so glad you are comfortable with the stories! I find the spider story really interesting," I said and told Linda how another spider had entered the story when I was writing it.

"It makes me think about reality, really," I continued. "When does something happen? The event with the spider happened at the lesson, and then you forgot about it, and I wrote a story while being scared by a spider, and here we are, talking about it and adding another layer to the story."

Linda smiled and opened her mouth to speak. But before she could do so, we were interrupted, this time by a student and not a spider. The next our paths cross, I hope the story continues.

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Appendices

Appendix 1:

Letter of approval from NSD

Vurdering av behandling av personopplysninger

Referansenummer	**Vurderingstype**	**Dato**
483251	Standard	17.01.2019

Prosjekttittel
Knowledge in music education: An analysis of the learning goals of three violin teachers and one curriculum framework

Behandlingsansvarlig institusjon
Norges musikkhøgskole / CERM - Senter for utdanningsforskning i musikk

Prosjektansvarlig
Mari Ystanes Fjeldstad

Prosjektperiode
01.01.2019 - 31.12.2022

Kategorier personopplysninger
Alminnelige

Lovlig grunnlag
Samtykke (Personvernforordningen art. 6 nr. 1 bokstav a)

Behandlingen av personopplysningene er lovlig så fremt den gjennomføres som oppgitt i meldeskjemaet. Det lovlige grunnlaget gjelder til 31.12.2022.

Meldeskjema ↗

Kommentar
Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 17.01.19, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

MELD ENDRINGER
Dersom behandlingen av personopplysninger endrer seg, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. På våre nettsider informerer vi om hvilke endringer som må meldes. Vent på svar før endringer gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 31.12.22

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER
NSD finner at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke behandles til nye, uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med

prosjektet
– lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen om behandlingen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og/eller rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp behandlingen underveis (hvert annet år) og ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet/pågår i tråd med det som er dokumentert.

Lykke til med prosjektet!

Kontaktperson hos NSD: Silje Fjelberg Opsvik
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

Appendix 2:

Interview guide 1

Intervjuguide – lærarar

Innleiing
- Kort om meg og prosjektet, godkjenning av opptak
- Eg vil utforske og forstå, ikkje bedømme eller vurdere

Fortid
- Utdanning og yrkeserfaring
- Sjanger, tradisjonar, skular
- Identitet? Fiolinist, fiolinlærar, kulturskulelærar, dirigent, musikar, lærar/pedagog?

Notid
- Dagens arbeidssituasjon
  - Kor mange elevar?
  - Kor mykje tid til undervisning?
  - Grupper/individuell undervisning, orkester?
  - Breiddeprogram, kjerneprogram eller fordjupingsprogram?
  - Kulturskule, strykeorkester eller andre organisasjonar?
- Kva er ein vanleg undervisningssituasjon, og kva skjer?
  - Repertoar, tidsbruk, aktivitetar.
  - Kva skal elevane lære? Læringsmål, lekser, øving.
  - Kven bestemmer? Lærar, elev, foreldre, kollegaer, rektor, rammeplan, andre?
- Kva rolle har heimeøving og heimesituasjon i undervisninga?
  - Kontakt med foreldre?
  - Kor mykje øver elevane?
  - Kva er nok øving? Er det nokon elevar som øver «nok»?
- Kvifor spelar du, og kvifor skal ungane spele?
  - Nytteverdi eller for moro skuld?
  - Overføringsverdi til andre ting?
  - Integrering, kulturarv, identitet, meistring?
- Samarbeid og fellesskap
  - Er det lærarsamarbeid? Når, korleis og med kven? Profesjonsfellesskap?
  - Spelar elevane med andre? Når, korleis og med kven?
  - Er kulturskulen ein del av lokalsamfunnet?

Framtid
- Kva ønsker du deg for elevane dine?
  - Langsiktige mål?
  - Vil du at elevane skal bli musikarar, amatørar og/eller publikummarar?
  - Allmenndanning?
- Korleis ønsker du at kulturskulen utviklar seg?
  - Rammeplan og styring oppanfrå og/eller autonome lærarar?
  - Tid, ressursar og oppgåver?
  - Kor mange og kven skal få undervisning?

Avslutning
- Er det noko meir du vil fortelje? Noko du vil utdjupe?

Eg lagar ikkje ei eigen intervjuguide til det andre intervjuet med kvar enkelt lærarar. Eg tar utgangspunkt i dei same spørsmåla som i denne intervjuguiden, og ønsker å utdjupe og diskutere temaa med utgangspunkt i det fyrste intervjuet og observasjonane.

Appendix 3:

Interview guide 2

Ny-materiell intervjuguide

Eg ser etter historier om kunnskap, kva den er og korleis den vert til i intra-aksjon mellom kulturelle og materielle praksisar.

Innleiing
- Kort om meg og prosjektet, godkjenning av opptak
- Eg vil utforske og forstå, ikkje bedømme eller vurdere

Kven er du som fiolinlærar?
- Utdanning og yrkeserfaring
- Sjanger, tradisjonar, skular
- Identitet? Fiolinist, fiolinlærar, kulturskulelærar, dirigent, musikar, lærar/pedagog?
- Dagens arbeidssituasjon
  - Kor mange elevar?
  - Kor mykje tid til undervisning?
  - Grupper/individuell undervisning, orkester?
  - Breiddeprogram, kjerneprogram eller fordjupingsprogram? Kva definerer det?
  - Kulturskule, strykeorkester eller andre organisasjonar?

Kven er fiolinelevane dine?
- Alder? Kjønn? Sosial bakgrunn? Støtte frå foreldre?
- Kvifor spelar dei fiolin? Kva er deira mål?

Kva vil du at elevane dine skal lære?
- Kva skjer på ein vanleg fiolintime?
  - Rutinar, rekkefølge?
  - Kva og kven bestemmer kva som skjer?
- Kva er det viktigaste at ein elev lærer?
- Kva synest du er lettast og vanskelegast å få dei til å lære?
- Kva skal elevane dine øve på heime? Korleis skapar du rammar for øvinga?
- Kvifor synest du det er viktig at ungar spelar fiolin?

Kven og kva bestemmer kva elevane skal lære?
- Kor stor fridom har du til å definere kva elevar skal lære?
- Kven/kva påverkar fridommen?
  - Kollegaer/rektor
  - Rammefaktorar som tid, instrument, ressursar
  - Elevar og foreldre, eigneøving og oppmøte
  - Rammeplanen
  - Tradisjonar innafor faget
  - Mål definert av andre, opptaksprøvar, felles prosjekt

Kva ønsker du deg for elevane dine?
- Langsiktige mål?
- Vil du at elevane skal bli musikarar, amatørar og/eller publikummarar?

Avslutning – Er det noko meir du vil fortelje? Noko du vil utdjupe?

Appendix 4:

Interview guide 3

Kva gjer det med undervisninga di og elevane si læring at den no skjer digitalt?

Korleis underviser du via nett?
       Live undervisning
       Opptak og tilbakemeldingar
       Dele ressursar som videoar og notar
       Oppgåver, øvebingo
       Samarbeidsprosjekt (Acappella eller liknande)
       Instruksjonsvideoar

Kva utstyr bruker du?
       Data, mikrofon, lydkort
       Kjøpt, lånt (jobbe eller venner/familie), hadde frå før
       Nettverk
       Synkronisering

Kva plattformar bruker du?
       Kvifor?
       Kva tilbyr dei ulike plattformane?

Kva utstyr bruker elevane?
       Nettverk
       Mikrofon
       Skjerm

Kva rom bruker du?
       Blir du forstyrra?
       Kva fungerer bra i rommet?
       Kva saknar du frå dine vanlege undervisningsrom?

Kva rom bruker elevane?
       Blir dei forstyrra?
       Plassering av elevar, notar, lys

Kva rolle har foreldra i nettundervisning?
       Meir eller mindre aktive?

Korleis fungerer det med instrument og utstyr?
       Stemming, vedlikehald og strengeskift
       Notar – delt skjerm, papir, gehør

Kva gjer endringa frå fysisk til nettbasert undervisning med elevane si læring?

       Intonasjon
       Teknikk
       Samspel
       Kropp
       Sosiale kodar
       Øving

Korleis opplever du det å undervise digitalt?

Trivst du?

Har du fått opplæring eller støtte? Treng du det?
  Leiinga
  Kollegaer
  Oppsøkt info sjølv? Kor?

Har du kontakt med kollegaer og leiing?
  Kva plattform?
  Kva gir det deg? Eventuelt, kva saknar du?

Kva forventningar møter du? Klarer du å oppfylle dei?
  Leiing
  Kollegaer
  Elevar
  Foreldre
  Deg sjølv
  Familie og heimeskule

Har du lært noko? Kva? Kan det brukast seinare?

Korleis ser du for deg tida framover?
  Ting som funkar no, men ikkje i all evigheit?
  Blir det lettare etter kvart, eller blir du meir og meir sliten?
  Kan du starte med nye elevar over nett?

Appendix 5:

Observation guide 1

Observasjonsguide

1. Kven?
   - 1.1. Kor mange?
   - 1.2. Aldersgruppe (4-10 år, 10-15 år, 15-20 år)
   - 1.3. Roller og instrument?
   - 1.4. Plassering i rommet?
2. Kva og kor?
   - 2.1. Kva slags rom?
   - 2.2. Instrument?
   - 2.3. Anna utstyr?
3. Kva skjer?
   - 3.1. Kva hendingar/handlingar/aktivitetar skjer?
   - 3.2. Kven tar initiativ? Kven bestemmer? Blir initiativ oversett eller fulgt opp?
   - 3.3. Kva roller finnes det? Faste eller flytande?
   - 3.4. Rutinar eller ritual?
   - 3.5. Konfliktar?
4. Læringsmål
   - 4.1. Kva blir retta på eller kommentert?
   - 4.2. Kva blir oversett?
   - 4.3. Kva mål vert uttrykt?
5. Verda utafor
   - 5.1. Øving til andre samanhengar?
   - 5.2. Framtidvisjonar?

Appendix 6:

Observation guide 2

Ny-materiell observasjonsguide

Eg ser etter samspel mellom materielle og kulturelle praksisar og korleis praksisane (det å gjere, men òg det er vere) verkar. Korleis vert kunnskapen i faget utøvande musikk til gjennom intra-aksjonar, og kva vert den til?

Handlingar (inkludert talehandlingar)
- Kven?
  - Kor mange?
  - Aldersgruppe (4-10 år, 10-15 år, 15-20 år)
  - Roller og instrument?
- Kva gjer dei? Korleis verkar det?
  - Ord, tonefall, verbale tilbakemeldingar
  - Kommunikasjon gjennom speling
  - Kroppsspråk, kroppshaldning, ro/uro, spenning/avspenning
  - Makthandlingar – inkludere, avvise, ta initiativ, styre handlingane
- Læringsmål/kunnskap
  - Kva vert jobba med og korleis? Kva vert prioritert og kva vert ikkje prioritert? Og kvifor?
  - Korleis vert læringsmål skapa, og av kven?

Rom/tid/stad
- Rommet – veggar, tak, møblar, vindauge, klang, ting
  - Skjer det intra-aksjonar? Kva vert til gjennom dei?
- Tida – klokka, kommentarar om tid, elevar som kjem tidleg/seint
  - Kva vert til gjennom intra-aksjonar med ulike former for tid?
- Grenser/rammer
  - Korleis vert rammene rundt undervisninga skapa? Felles fokus/aktivitet? Rutinar? Kroppar og/eller medvit vendt mot same fokus?
  - Kva bryt rammene? Folk som kjem og går? Forstyrringar utanfrå? Vandrande fokus hjå elev og/eller lærar?
  - Kva skjer med brota? Avvist eller tatt imot? Av kven?

Materie/ting
- Kva ting verkar? Og korleis?
  - Fiolin, boge, leksebok, notestativ, notar og så vidare. Korleis verkar dei?
  - Verkar fråvær av ting?

Appendix 7:

**Information letter and
consent form students 1**

Kan jeg få se på når du får fiolinundervisning?

Din fiolinlærer er med på et forskningsprosjekt der jeg undersøker hva fiolinlærere vil at elever skal lære. Derfor vil jeg gjerne se på når hun/han underviser deg. I dette skrivet får du informasjon om meg og prosjektet mitt, og om hva det vil bety for deg å si ja til at jeg får se på undervisningen.

Om meg
Mitt navn er Mari Ystanes Fjeldstad. Jeg bor på Haugerud i Oslo, og har jobbet som fiolinlærer i ti år. Fra og med høsten 2018 er jeg ansatt som doktorgradsstipendiat ved Norges musikkhøgskole. I tillegg er jeg fiolinlærer og dirigent i Haugerud strykeorkester.

Om prosjektet
Mitt doktorgradsprosjekt handler om kunnskap i instrumentalundervisning. Jeg vil undersøke hva fiolinlærere vil at fiolinelever skal lære, og hvordan dette henger sammen med læringsmålene som står i rammeplanen for kulturskolen. Jeg intervjuer tre lærere om dette. Jeg vil også se på når de underviser for å få vite mer om hva de gjør i praksis.

Hva skjer hvis du sier ja?
Hvis jeg får lov til å se på når du får undervisning, kommer jeg til å være sammen med deg og læreren din tre til fem ganger. For å huske bedre hva som skjer kommer jeg til å ta lydopptak og skrive ned hva som skjer. Jeg er ikke opptatt av deg, men av hva læreren din sier og gjør. Du kan når som helst ombestemme deg og be meg om å gå.

Den informasjonen jeg samler vil jeg bruke som grunnlag for å skrive en avhandling og noen vitenskapelige artikler, ingenting annet. Det er bare jeg og min veileder, professor Sidsel Karlsen, som vil få se informasjonen. Det det vil ikke være mulig å kjenne deg igjen i det jeg skriver. Når prosjektet er avsluttet, senest 31. desember 2022, blir lydopptakene slettet.

På oppdrag fra Norges musikkhøgskole (NMH) har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket. NMH er behandlingsansvarlig institusjon.

Hva skjer hvis du sier nei?
Du vil få din undervisning som vanlig, uten at jeg er tilstede.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

Har du spørsmål?
Ta kontakt med meg på mobil 414 75 424 eller e-post mari.y.fjeldstad@nmh.no. Du kan også ta kontakt med personvernombud ved NMH Otto Christian Pay (otto.c.pay@nmh.no) eller NSD – Norsk senter for forskningsdata AS (personvernombudet@nsd.no, 55 58 21 17).

Med vennlig hilsen

Mari Ystanes Fjeldstad
Stipendiat ved Norges musikkhøgskole, Fagseksjon for musikkpedagogikk og musikkterapi

--------------------------------------- klipp her ---------------------------------------

Ja, Mari Ystanes Fjeldstad kan se på og ta lydopptak når

_____
navn på barn

får fiolinundervisning.

Dato: _____

_____
Signatur foresatt

Appendix 8:

**Information letter and
consent form students 2**

Kan jeg få se på når du får fiolinundervisning?

Din fiolinlærer er med på et forskningsprosjekt der jeg undersøker hva fiolinlærere vil at elever skal lære. Derfor vil jeg gjerne se på når hun/han underviser deg. I dette skrivet får du informasjon om meg og prosjektet mitt, og om hva det vil bety for deg å si ja til at jeg får se på undervisningen.

Om meg
Mitt navn er Mari Ystanes Fjeldstad. Jeg bor på Haugerud i Oslo, og har jobbet som fiolinlærer i ti år. Fra og med høsten 2018 er jeg ansatt som doktorgradsstipendiat ved Norges musikkhøgskole. I tillegg er jeg fiolinlærer og dirigent i Haugerud strykeorkester.

Om prosjektet
Mitt doktorgradsprosjekt handler om kunnskap i instrumentalundervisning. Jeg vil undersøke hva fiolinlærere vil at fiolinelever skal lære, og hvordan dette henger sammen med læringsmålene som står i rammeplanen for kulturskolen. Jeg intervjuer tre lærere om dette. Jeg vil også se på når de underviser for å få vite mer om hva de gjør i praksis.

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Hvis jeg får lov til å se på når du får undervisning, kommer jeg til å være sammen med deg og læreren din tre til fem ganger. For å huske bedre hva som skjer kommer jeg til å filme, ta lydopptak eller skrive ned hva som skjer. Jeg er ikke opptatt av deg, men av hva læreren din sier og gjør. Du kan når som helst ombestemme deg og be meg om å gå.

Den informasjonen jeg samler vil jeg bruke som grunnlag for å skrive en avhandling og noen vitenskapelige artikler, ingenting annet. Det er bare jeg og min veileder, professor Sidsel Karlsen, som vil få se informasjonen. Det det vil ikke være mulig å kjenne deg igjen i det jeg skriver. Når prosjektet er avsluttet, senest 31. desember 2022, blir filmene og lydopptakene slettet.

På oppdrag fra Norges musikkhøgskole (NMH) har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket. NMH er behandlingsansvarlig institusjon.

Hva skjer hvis du sier nei?
Du vil få din undervisning som vanlig, uten at jeg er tilstede.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

Har du spørsmål?
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Med vennlig hilsen

Mari Ystanes Fjeldstad
Stipendiat ved Norges musikkhøgskole, Fagseksjon for musikkpedagogikk og musikkterapi

-- klipp her --

Ja, Mari Ystanes Fjeldstad kan se på når

_____
navn på barn

får fiolinundervisning.

Hun kan (sett kryss)

	Ja	Nei
Filme		
Gjøre lydopptak		

Dato: _____

_____
Signatur foresatt

Appendix 9:

**Information letter and
consent form teachers**

Vil du delta i et forskningsprosjekt om kunnskap i kulturskolen?

Jeg skal gjennomføre et doktorgradsprosjekt med den foreløpige tittelen «Knowledge in music education: An analysis of the learning goals of three violin teachers and one curriculum framework». I dette skrivet får du informasjon om meg og mitt prosjekt, og om hva det vil bety for deg å delta.

Om meg
Mitt navn er Mari Ystanes Fjeldstad. Jeg bor på Haugerud i Oslo, og har jobbet som fiolinlærer i ti år. De siste årene har jeg jobbet i Nittedal strykeorkester, Skedsmo kulturskole og Haugerud strykeorkester. Jeg har også jobbet som El Sistema-lærer og musikklærer, og jeg har hatt Stryk i Skolen-undervisning. Fra og med høsten 2018 er jeg doktorgradsstipendiat ved Norges musikkhøgskole, ved siden av å undervise i Haugerud strykeorkester.

Om prosjektet
Instrumentalundervisning er et fag med en lang tradisjon, og vi som driver med det vet godt hva elevene skal lære. De skal jo lære å spille! Men det er forsket lite på hva det vil si å lære å spille, og på hva kunnskap i instrumentalundervisning er. Det er derfor tema for mitt doktorgradsprosjekt. Jeg vil undersøke tre kulturskolepedagoger sine forståelser av hva elever skal lære, og jeg vil analysere kulturskolens rammeplan med særlig vekt på de ulike læringsmålene. Jeg spør deg om å delta fordi jeg tror du har interessante refleksjoner og erfaringer som vil bidra positivt til prosjektet.

Norges musikkhøgskole er ansvarlig for prosjektet. Jeg skal gjennomføre det ved hjelp av min veileder professor Sidsel Karlsen.

Hva innebærer det for deg å delta?
For å få et godt bilde av hva du vil at elevene dine skal lære og hvordan du forstår kunnskap i instrumentalundervisning, vil jeg både intervjue deg og observere undervisningen din. Jeg vil gjerne starte med et intervju der vi blir litt kjent med hverandre og der du forteller om hva du synes er viktig at elevene lærer. Deretter vil jeg observere undervisningen din.

Du kan velge tid og sted for intervjuene og undervisningen. Intervjuene vil ta cirka en time. Vi bestemmer sammen hvilken og hvor mye undervisning jeg skal observere. Du kan også velge om jeg skal være en passiv observatør, eller om jeg skal ha en rolle i undervisningen. Jeg vil også gjerne filme noe av undervisningen. Vi bestemmer i fellesskap hvilke timer som kan være aktuelle. Jeg ser for meg å filme et par elever tre til fem ganger. Før jeg filmer innhenter jeg samtykke fra de foresatte til hver enkelt elev.

Jeg vil gjerne avslutte med et intervju der du kan utdype tankene dine, og der jeg kan spørre om ting jeg lurer på. Perioden med intervjuer og observasjon vil strekke seg over ca to måneder, og vil bli gjennomført i vårsemesteret 2019.

Jeg vil ta opp intervjuene og deretter skrive ned det vi sier, og jeg vil ta notater fra undervisningen. De transkriberte intervjuene og observasjonsnotatene vil bli anonymisert. Jeg sender intervjuene og et kort sammendrag av observasjonsnotatene til deg for gjennomlesing.

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke deg uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan jeg oppbevarer og bruker dine opplysninger
Jeg vil bare bruke opplysningene om deg til det jeg har fortalt om i dette skrivet. Jeg behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Det er bare jeg og min veileder professor Sidsel Karlsen som vil ha tilgang til datamaterialet jeg samler inn, og jeg vil ikke oppbevare ditt navn sammen med lydopptakene og filmen.

Prosjektet vil munne ut i en doktorgradsavhandling i form av en monografi, og artikler som baserer seg på denne. I avhandlingen som jeg skal skrive, kommer jeg til å skrive en presentasjon på tre til fem sider av hver deltager. Det er mulig at noen som kjenner kulturskole-miljøet godt vil kunne forstå hvem du er ut i fra det jeg skriver om din undervisningserfaring og utdanning. Jeg vil derfor sende deg presentasjonen av deg for godkjenning hvis du ønsker det.

Prosjektet skal avsluttes senest 31. desember 2022. Jeg vil slette film- og lydopptak når prosjektet er avsluttet.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Jeg behandler opplysninger om deg basert på ditt samtykke. På oppdrag fra Norges musikkhøgskole har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Vil du vite mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:
- Norges musikkhøgskole ved Mari Ystanes Fjeldstad på mari.y.fjeldstad@nmh.no eller mobil 414 75 424, eller min veileder Sidsel Karlsen på sidsel.karlsen@nmh.no e-post eller 476 63 970
- Vårt personvernombud: Otto Christian Pay (otto.c.pay@nmh.no)
- NSD – Norsk senter for forskningsdata AS, på epost (personvernombudet@nsd.no) eller telefon: 55 58 21 17.

Med vennlig hilsen

Mari Ystanes Fjeldstad
Stipendiat ved Norges musikkhøgskole, Fagseksjon for musikkpedagogikk og musikkterapi
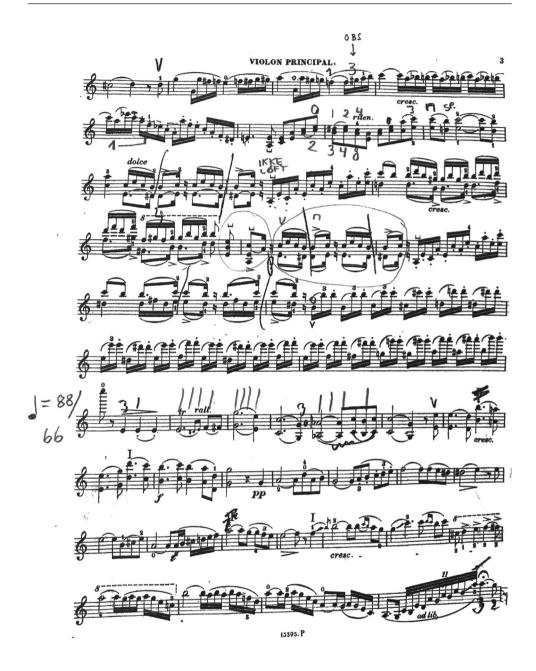
Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet «Knowledge in music education: An analysis of the learning goals of three violin teachers and one curriculum framework», og jeg har fått anledning til å stille spørsmål. Jeg samtykker til:

Ja   Nei

☐   ☐   å bli intervjuet

☐   ☐   å bli observert når jeg underviser

☐   ☐   å bli tatt lydopptak av når jeg underviser

☐   ☐   å bli filmet når jeg underviser

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet i 31. desember 2022.

Dato:

(Signatur prosjektdeltaker)

Appendix 10:

Bériot Concerto No. 9

What happens in music lessons held in a municipal school of music and performing arts? Previously, researchers have studied this by interviewing teachers and leaders and by analyzing policy documents. But what about the music? The students? And all the surprises bound to happen when children play music?

In this dissertation, Mari Ystanes Fjeldstad explores the enactments of violin lessons by telling stories based on observations of three teachers and their students. In the stories, violins go missing; spiders, stickers, and students interrupt the teachers' plans; and professors of the past lurk in the corners. The stories also tell about how violin lessons became a stuttering mess of lagging sound and frozen images as the pandemic moved the lessons to online meeting rooms, and about how teachers and students handled these stressful situations.

By reading the stories through feminist new materialist and posthuman theories, Fjeldstad develops four theoretical concepts. These are useful for researchers aiming to generate a broader insight into music education practices. The dissertation also creates knowledge of how the possible futures offered to the students are connected to social categories such as race, gender, and class. By doing so, it contributes to a feminist new materialist and posthuman music education research that might move us toward to a more socially just music education.

Mari Ystanes Fjeldstad (b. 1982) is a violin teacher, a music teacher, and a music education scholar.

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