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# A Mother-Mathematician Meets the COVID-19 Era

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## Synopsis

Just ask the family cat: we are not all in this together, and never were. In this piece, I describe my journey as a mother and mathematician in the United States during the COVID-19 pandemic. Even though I am one of the lucky ones, we could do so much better.

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“I’m a KNITTING NEEDLE!” shouts my now four-year-old as she zooms through the kitchen with several yards of yarn wrapped around her.

She and our six-year-old run through the house toward the stairs, close on the heels of our beloved tux cat. I grit my teeth: the internet kicks me out again just as I’m trying to send an email that seemed urgent a moment ago. “What are you doing to the cat?” I call up the stairs. My voice sounds as weak as it feels.

“We’re studying his body!” shouts my six-year-old. “We want to know how it works!”

“Stop chasing him!” I counter, finding my mom voice.

“But we need more INFO-NATION!” shouts my four-year-old back.

My six-year-old leans toward the cat, who inexplicably has come to a peaceful rest on the stair landing.

“What are you doing to him?” I ask.

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My computer dings as my neglected inbox that I've been trying to whack at all day grows three emails higher. I feel nauseous as I realize I haven't prepared the talk I need to give next week, yet relieved that the internet seems to be back . . . maybe?

"Oh," she explains nonchalantly, "we're going to study him by pretending to be his mama."

"Okay . . ." I respond. That doesn't sound so bad. "How are you going to do that?"

"We're going to LICK him!" my four-year-old shouts gleefully.

I then notice a trail of water on the floor. My six-old follows my gaze. "Don't worry, Mommy. It's not puke," she explains helpfully.

This is the happy chaos that we converged to after a year of COVID-19. Rewind to one year earlier, before I had forced myself to take my work email off my phone: I woke up early one morning to an email that made my stomach flutter. It was from the journal that had accepted our paper subject to minor revisions weeks before.

*Dear Author, the email started, we regret to inform you that we have made the decision to reject your paper . . .*

Wait, no. What?! Confused, I read and reread the email. Surely this was some mistake. They had *accepted* our paper. I had so carefully made every revision requested, even turning one theorem into a full-out characterization.

I thought back on the last few weeks, scouring my email to see if I had somehow misunderstood the earlier acceptance. This was supposed to be a moment of triumph. The results from the paper had gone into undoubtedly the best talk I had ever given, at which I connected with nearly everyone in the audience at a venue where a group of senior mathematicians had made me feel miserable a decade before as a graduate student. When one such senior mathematician had tried to criticize one of my results this time, I cheerfully showed him where he was wrong, and had realized a little smugly that I had now published more papers than most of the folks who had criticized a ten year younger version of me. I had already daydreamed how I would share this on the Facebook Math Mamas group as a proud moment, my great talk and now my Very Important Paper in a Very Important Journal with my Very Awesome Student Coauthor. A good paper, it was not a slam-dunk, but over

eighteen months of dealing with the journal, I had earned my acceptance, which arrived as the pandemic launched our lives into confusion. As we looked after our (then) three and five-year-old at home full time, carving out just enough time to teach our classes and not get fired, my husband and I had carefully plotted how to carve out a little extra time so I could make corrections, turn them around, and see the paper published.

Now the editor had changed his mind. I sent an email of appeal, but it did not help. As murmurs of the pandemic-induced drop in submissions by women authors emerged, I found myself angry on behalf of my only coauthor, a woman, and myself.

“Do you know how much I had to turn my life upside down to finish that paper?” I wanted to ~~shout at~~ politely ask the editor. But of course, I didn’t.

Fortunately, perhaps, there was little time to stew. We were in survival mode. Our youngest child was potty training, making for interesting Zoom meeting interruptions. I had to make decisions about our summer REU. I watched research opportunities pass by me, knowing I didn’t have the time to pursue them. Because of the pandemic, babysitters were not an option. I felt nauseous more often than I didn’t. The worst part was how my own parenting made me sick. We used TV as a babysitter when we both had to teach at the same time. I frantically ordered piles of educational games off of Amazon just to give my kids something to do that at least appeared vaguely healthy, while I wondered how other mothers posted questions on Facebook about the best homeschool philosophies, reports of the eight nutritious recipes they had tried that week, and pictures of their carefree weekend family outings to the woods. I found myself wondering how everyone else had the bandwidth to worry about the subtleties of education and try out new recipes while I struggled to tread water.

Things got easier mentally when I surrendered. No, I was not going to run the REU this summer. I reluctantly accepted that research was not going to happen for a while. I resubmitted our paper to another journal, and kept on moving. Meanwhile, my undergraduate coauthor decided to go into industry, instead of graduate school.

Despite her potential, I did not argue. I felt a little bit sad that I could not find it in me to try to convince her to go the graduate school route, but I just couldn’t. I let myself be happy for her, that she had found a path

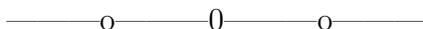
she was excited about, and had a job. The K-12 “school year” (such as it was) ended. When our kindergartner’s teacher gave out awards via Zoom to each child, my husband and I had to step out of the room to hide our faces from our daughter as we noticed the boys getting engineering, math, and learning awards while the girls were given awards for clothes, personality, and attitude.

The summer was the longest stretch I had off from work in years, other than maternity leaves that — while magical — had been more exhausting than work. I had a chance to enjoy my children. We bought the biggest inflatable swimming pool we could find and played in it on hot days. Our youngest potty trained and weaned. I did crossword puzzles with my husband. After several years of having at least one toddler or baby while going through pre-tenure life, I was getting full nights of sleep— like, eight blissful hours in a row most nights — and remembered how to relax. It was a tremendous relief after having to go through the farce of simultaneously working full time while watching two young children.

It was a short break in the middle of a long struggle, however. As we ramped up for the academic year, the difficulties returned. A well-meaning colleague gushed about the article he had published about teaching during COVID-19, and I had to force myself not to wince. After using scraps of precious time to contribute to evidence-based recommendations for the handling of tenure and promotion candidates during the pandemic, I was dismissed by a colleague without any caregiving responsibilities because tenure candidates with concerns can “just extend for a year, so it’s fine.”

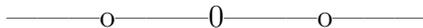
As vaccines became available and COVID-19 case numbers declined in many areas, it seemed that life was returning to normal for some people, but not for others. Adults stopped wearing masks at the grocery store. Meanwhile, toddlers at the daycare were suddenly mandated to wear masks. Restaurants were open at full capacity, but childcare hours were still limited. Though people around me were celebrating relative normalcy, our family members in India were seeing the Delta variant spread like wildfire around them. As I donned my mask in solidarity with my children, who were too young for vaccines and still had to wear masks in any public place, I had the uneasy feeling that part of the world was moving on, and leaving the other part behind, especially children and their caregivers.

In an interview, Mary Ellen Rudin mentioned that she liked to do mathematics in the middle of things, often on a couch in the middle of her house with her children climbing around her, while her husband preferred to retreat to his study [1]. While I'm no Mary Ellen Rudin, as I adapted to motherhood, I found myself learning to do mathematics surrounded by children and activity, when I used to need a quiet room. However, it's out of a need to adapt — for an important reason, one that I would never give up — that I now do math this way. Humans grow into the constraints around them.



The pandemic has been a strain on my family and myself, but we're lucky. Had I been going through the job market as COVID-19 hit, especially if I had children while trying to job hunt, I doubt I would have made it. I see others around me — single mothers, women of color, mothers of children who have severe disabilities — and although I really don't understand what they're going through in their own lives, I know that they have it way harder.

It's for precisely this reason that elitism in mathematics — rating mathematicians as first, second, or third most “brilliant,” whatever that means, is a practice that's useless at best, and often harmful. We need to make room for all kinds of mathematicians. Most constraints around us — systemic racism, lack of adequate childcare, lack of access for people with disabilities — infiltrate every part of life in our society, far beyond the bounds of mathematics. But the weight of these problems is precisely why we need to be aware of them in every part of our lives, including when we do mathematics and interact as a mathematical community.

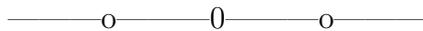


A year and a half later, things are better for my family, though we do need to keep an eye on how the children treat the cat. Both kids have some (limited but cherished) in-person school or daycare. Balancing work and family life still seems impossible at times: the logistical nightmare of figuring out who picks up who when and what we do when a child gets a sniffle sometimes seems like a whole day's work in itself. For a while, my “research backburner” dropped so far back that I didn't remember what was there

anymore, but over the past six months or so, suddenly I've found myself seriously overcommitted. It's been truly joyful to collaborate on mathematics I forgot I enjoyed so much with many great mathematicians who are even better humans, and it's also allowed me to start stripping away the projects that aren't what I've realized I like to do. The negative side, however, is that I'm not the zealous collaborator I once was, spending hours upon hours working on a result and checking. I don't always make progress. I make more mistakes than I care to admit. I contribute what I can, and also count on the empathy, kindness, and team spirit of the people around me.

The short version of the story about our paper with the surprise rejection is a happy one: it was finally accepted at a different journal, with some of the kindest comments from a reviewer I've ever been lucky enough to encounter. The long story is that the path was bumpier: the first journal we submitted to wasn't really a fit — though it wasn't until the editor politely informed of this that I could see it myself — then garnered such a bizarre review at another journal that I could only shake my head and withdraw the paper, something I had never done before. The silver lining is that I've learned to appreciate reviewers who carefully read, and have genuine affection for those who go above and beyond by providing thoughtful feedback, whatever their decision may be. Kind, constructive reviewers: you do make a difference. Thank you.

My student coauthor who has so much potential has settled into industry. Perhaps she would have chosen industry even if the pandemic hadn't happened, even if we hadn't had such a hard time with our paper. Perhaps she'll be happy there, and that's fantastic. But there are many other potential mathematicians whose lives have been altered by the pandemic: some in horrible and dramatic ways such as catastrophic loss of life, others in smaller but still difficult ways, such as the loss of a family business, or loss of childcare for too long during a critical period.



This is where I originally ended my essay, but it never seemed right. When I came back and read what I had written a few weeks later, I realized that I had carefully carved out the pieces of my life that surround me without mentioning my own current state. So, at the risk of revealing my self-involved side, here goes.

As life normalizes slightly for my family, my life gets easier. But — as I think many of us sensed, even if we're lucky to be alive, healthy, and employed — months of attempting to work full time and simultaneously care for a family without needed support eventually takes its toll.

A few months ago, I was sure I was having a heart attack. I woke in the middle of the night to a whole list of classic symptoms, straight out of an online blog that starts something like, "I was a healthy woman in my early 40s, and then suddenly I was having a heart attack." Despite being on the verge of losing consciousness, I remember thinking, holy crap, I'm going to die. What the heck will my husband and kids do? My husband called 911. I felt both ridiculous but terrified.

By the time the paramedics came, I felt way better (even if still ridiculous and now shivering) though weird little feelings persisted for weeks. The EKG showed nothing. When I finally saw my doctor a couple of weeks later — they were booked solid, and tough to even get on the phone after 15 minutes on hold — it took her about 30 seconds before she went straight to mental health questions. What made me happy? Did I find joy? Was anything bothering me in my life? (*Other than, you know, managing a 55-hour-per-week job in 20 hours per week? Hmm, nothing at all, thanks*). Before I knew it, she was rattling off the different medications that can help with anxiety.

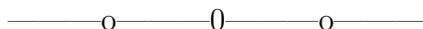
I was offended, frustrated, and irritated. Why go straight to mental health when we weren't sure this wasn't physical? And I'm still annoyed. This kind of thing happens to women too often: the assumption that our problems are in our heads.

But part of me realized that she wasn't totally unjustified, even if she was too hasty and probably skipped a few important steps. "Even if it IS anxiety, and I'm not saying it is," went my internal monologue, while knowing it sounded defensive, "then the problem still isn't in my head, it's the fact that I have too much to do and too little time. Now how about lending me a hand a few afternoons a week, thank you very much!"

This has been the problem. I'm very lucky and I know it. But for many people out there — particularly many mothers — the COVID-19 era has stretched us thinner than we thought we could stretch, and we won't all just simply bounce back, if and when things totally normalize. It has dawned on me that our society was built on the backs of some more than others.

When the going got tough, there were few solutions, and little help. Just shrugs. All we could do is tough it out, struggle with the impossible, and hope things would get better. While it sounded nice, the slogan “we’re all in this together” never really rang true for many. Out of the 41 countries listed in UNICEF’s Family Friendly Policy Report that was gathered from 41 high- and middle-income countries, the United States was the only one that had 0 weeks of paid leave for new mothers [2]. As many of us sensed from the beginning, we didn’t even start off the COVID-19 journey “in this together.”

Our society was designed under assumptions as eyebrow-raising as “assume a cow is a sphere,” including the assumption that people who work either do not have children, or have childcare readily available. As we walk across the metaphoric bridge that we designed under our unrealistic assumptions, crises like a global pandemic that perhaps we could not have predicted pile on top of our naive planning to start a series of frightening oscillations. We don’t notice when one person is thrown off the bridge, but we do notice as resonance makes the whole structure collapse.



I wanted to end on a happy note. Here is the best I can do. The cat is still doing fine, despite his family’s sudden inexplicable bout of terrible judgement (his opinion): yes, we adopted a dog. Though it’s through clenched teeth at times, I can honestly say “I’m one of the lucky ones” each day. My wonderful little family is still alive and healthy, and we still have income. I still get to do math, and I get to work with awesome collaborators, who are cheerful and supportive of fellow mathematicians with caregiving responsibilities, whether or not they are currently caregivers themselves. But we have to find better ways to support each other in general, because, to quote from Anna Helen Petersen’s interview of Jessica Calarco [3], it is not okay that “other countries have social safety nets. The U.S. has women.”

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