

Math Anxiety and Gym Class,

Or How Teaching Math Led Me to Scale High Walls

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My elementary school gym class was a regular lesson in dogged failure. I was the worst in the class at every measure on the Presidential Fitness test. My bar hang time was three seconds (the time it takes to fall); I ran so slowly that my teacher refused to believe I'd jogged every step of the mile. The baseball unit is engraved on my mind as two weeks of aggravated misery: This is the only sport where the class lines up to watch you fail. By middle school, I had evolved strategies that kept me in the outfield or perennially in the middle of the line to bat. I have hit a baseball with a bat exactly once in my life, in seventh grade. I was too astonished to believe ball and bat had connected. It was a foul.

In high school, I avoided physical education altogether, with the excuse that my schedule was too full of advanced math classes. Somehow I still found time for four years of art. I considered not attending my first-choice college because it required a year of PE courses, but at last overcame my trepidation, with the help of a generous financial aid package. I fulfilled my requirement with the maximally geeky courses, which at that time were fencing and English country dance. For the first time in my life, I was not alone: half

the people in the room had been the worst kid in *their* elementary school gym classes.

Yet I still found myself logging my failures: I struggled to be aware of my body in space, I never remembered dance steps, and I couldn't see where the tip of my opponent's foil was going (it later transpired that I needed glasses). More than once I was so struck by new evidence of my own inadequacies that my opponent scored a touch.

As an adult, my main source of exercise was walking to work; I ducked

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out of the bike rides and Ultimate Frisbee games that constitute young mathematicians' socialization. But then my Ph.D. adviser declared he was moving to Edmonton, Alberta, and I suddenly anticipated life in the land of bitter cold. (“It's 40 below in Fahrenheit or Celsius!” my adviser said cheerfully.) I needed a physical activity that could be conducted inside and wouldn't make me miser-

able. I needed to squeak around my own psychological barriers. I decided to use what I knew about how people learn math.

I'd learned I was a failure in gym class, but lots of kids decide they're a failure in math class. When you're a mathematician, everyone you meet tells you either, “I hate math,” or, “I was good at math until _____” (until middle school, until algebra, until geometry, until calculus or linear algebra or proofs). In office hours and during group work sessions, I discovered my math students—my smart, motivated, university students—were creating the same sorts of error logs I'd made in fencing class.

My female students seemed particularly distracted by negative mental cataloguing. Psychologists studying “stereotype threat” have shown that simply asking students to think about their gender can cause women to score worse on math tests; all that attention to failure makes it hard to concentrate.

I had somehow avoided the stereotype that girls are bad at math, only to fall prey to another stereotype, that smart kids are bad at sports. Could I use strategies that help women in math to help myself enjoy being active?

One important strategy is to focus on hard work and gaining experience. Experience is flexible; an apparent talent may simply be transferred experience. I knew that one of the reasons I aced my geometry and

topology qualifying exam in graduate school, for instance, is that I'd taken multiple geometry and topology courses as an undergraduate.

When I thought about grade school PE in terms of experience, instead of innate talent, suddenly things looked different. Of *course* I never learned to play baseball. I tried only during class, two weeks a year! Other kids played catch with their dads on the weekends, owned their own mitts and bats, maybe joined a softball team. My own parents, though rather athletic, favored solitary pursuits; they'd taught me how to swim, ride a bike, and set up a tent (and given me a solid grounding in elementary school mathematics), but team sports were foreign to my family.

I vowed that, whatever activity I chose, I would compare myself only to myself. I didn't know what other people's backgrounds were; I wouldn't beat myself up for not having them.

I also knew that all sorts of people can do math, if they don't think it's math. People invest hours in Sudoku or identifying the best combination of stats for their video game characters or poker; I had otherwise mathphobic friends who had taken statistics as psychology or anthropology majors—and excelled. Could I find a sport that I didn't believe was a sport? Nonsport sports had no teams, I decided, and no overt references to fitness.

Finally, I gave myself the “You are not a snowflake” lecture. I couldn't be unique in the universe in this regard—I wasn't actually the worst kid in the history of gym class. I must have *some* relevant strengths, if only I could identify them.

I settled on two: I'm not insecure

about how I look, even when sweaty and uncomfortable (I had dodged that message about femininity, along with the one about girls and math), and I have a fairly high tolerance for physical pain. Also, I like heights. That wasn't a tolerance for negatives; that was a genuine positive! Maybe I needed a nonsport sport involving heights?

I gathered my courage, called my most charismatic friend—the one who, in high school, persuaded me to drive hundreds of miles in a weekend and ask a boy to Winter Ball—and asked her to take me rock climbing.

My friend belonged to a posh, suburban rock gym. The walls were



The author's climbing partner and former graduate school colleague, Megan McCormick, on a climb near Vantage, Washington.

molded, like a zoo exhibit, to look like rock. Holds marked with brightly colored tape stretched toward the ceiling. I rented a harness and shoes; my friend tied me in with an elaborately curled knot. We recited the ritual safety check, ending with “Climb on!” I got about a third of the way up the wall, fell, and swung wildly. Since I trusted my friend, I liked falling! She climbed; her husband climbed; I climbed and fell again. By the end of the night, my arms burned, and I felt as if I was floating.

I signed up for a class at my university's climbing gym and learned to tie my own knots. I found a climbing partner, another short, female

math grad student, who to my great good fortune was one of the most genuine, encouraging people on this planet. I acquired some dramatic bruises; I bought my own shoes. Then I learned I wasn't moving to Edmonton after all—I had a postdoc in Southern California—and I kept climbing.

Rock climbing is a fairly popular sport among mathematicians, perhaps because it consists of individual “problems.” I started out grabbing any hold on the wall; after a few weeks I was climbing the lowest-numbered routes, and as I gained strength and confidence, I worked on higher ratings.

A month or so in, I realized I'd made a minor psychological breakthrough: I wasn't just worrying about when my arms would fall off, I was thinking about body mechanics; that is, how to balance myself on the wall to reach the next hold.

Climbing has some of the same gender-balance difficulties as math, in part because many women become frustrated at the arms-falling-off stage and aren't able to invoke flexibility and balance. Here, though, my vow to compete only with myself stood me in good stead. I wasn't annoyed by the adolescent boys with their Tarzan moves, because compared with the kid with the three-second bar hang, I was *amazing*. ■

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