Schrödinger's Cancer

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Did he love the cat?

I was lying prone on a cold, sterile pad at the edge of a CT scanner when this question first occurred to me. My face was pressed into a foam cradle as I listened to the whine of a drill slowly grinding its way through the sixth vertebra of my thoracic spine.

My journey to this moment had begun a month and a half earlier. I had started running again after several months off. Each spring, for nearly four decades, I looked forward to mornings when I could wake up with the sun, strap on my running shoes, and run in those first rays of sunlight, interrupted only by the songs of nesting birds and the rhythmic pulses of lawn sprinklers. This year was different. A few days into my routine, I began to feel an unfamiliar, nagging ache between my shoulder blades. At first, I tried to push through it, thinking it would go away as I loosened up. But over the next few days it only intensified, clearly aggravated by the act of running. I switched to walking, hoping the break from running would push the ache away. The pain persisted.

I reconsidered my complacency briefly when the pain began awakening me in the middle of the night, but I didn't really worry. Surely it was like every other new pain I'd experienced in the course of my life — a deviation from normal that would pass with time. A massage only increased the soreness. When a brief attempt at yoga left me crumpled on the floor in agony, I made an appointment to see my doctor. Since the appointment was more than a week away, I shared the details in an electronic message and requested a muscle relaxant to see if that might help me sleep through the night.

My doctor's reply was appropriate and terse. "You need an x-ray."

Of course I did. Had a patient come to me with the same story, I would have ordered an x-ray in an instant, and yet I had rationalized my own symptoms for nearly a month. In addition to the nagging ache between my shoulder blades, I felt embarrassed at my own foolishness. How could I have ignored the obvious for so long?

Which is where the cat came in.

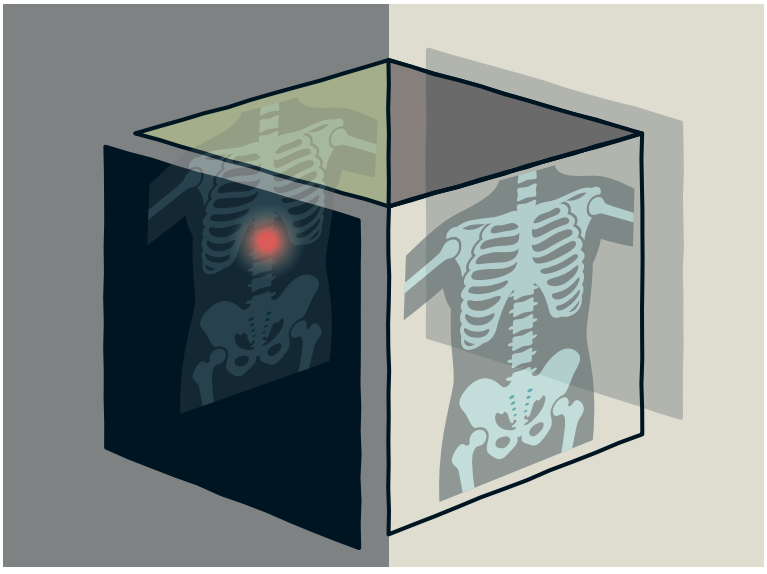
In 1935, in a discussion with Albert Einstein, the physicist Erwin Schrödinger proposed a thought experiment. Imagine a cat sealed in a steel box with a flask of poison. Above the flask is a hammer attached to a Geiger counter, and in the Geiger counter, a radioactive particle. There is an equal probability that over time, the particle will decay. If it does, the counter will record the event, release the hammer, smash the flask, and thereby kill the cat. You, the observer, sit outside the box. Is the cat alive or dead?

The scenario was meant to illustrate one of the theoretical challenges of quantum mechanics. Before the box is opened, there is an equal likelihood that the atom is decayed or undecayed, and that correspondingly the cat is dead or alive. Clearly a cat cannot exist in two states simultaneously. Once an observer looks inside the box, only one outcome is possible. Schrödinger's scenario raises questions about the relationship between observation and reality. It is absurd to think that the act of observation kills or saves the cat, and yet the act of opening the box definitively cements the outcome.

My heart sank as I saw the image on the x-ray. The regular row of vertebral squares stretching from my neck to my pelvis was interrupted. A child could have picked out the problem. Just above the midpoint of my spine, a single, irregular wedge of white bone stood in sharp contrast to the regular cubic contours above and below it.

In the days leading up to that moment, I had casually entertained possibilities other than a normal finding. Maybe it was a fracture. If so, there was still a long list of possible causes. A fragility fracture from osteoporosis would force me to rethink some things like skiing and mountain biking, but it was survivable, and the pain would soon pass. Cancer was a more ominous possibility and not one I would be likely to survive. Before that moment, though, I had spent little time considering either. But with the x-ray, I had peeked in the box. I had a compressed vertebra. The flask was shattered. Was it poison that spilled out or something more benign?

A succession of tests followed over several weeks. My bone density was low, but maybe not low enough to explain the fracture or its unlikely location. An MRI showed marrow edema that seemed more significant than a fragility fracture would justify. A CT scan revealed a degree of sclerosis that was more typical of a cancer than a fracture. With each peek in the box, the possibilities



and probabilities shifted. Either I had a survivable condition that I could adjust to, or I would soon be discussing my odds of survival. None of these tests gave a definitive answer.

Since the moment the vertebra had collapsed, my body had not changed states in noticeable ways, but I had. Dying had always been the work of another day. Was that still true, or was it now my work? My mind and my mood swung wildly between two possible futures like an electron leaping between different orbits. Moments of dread and normalcy alternated unpredictably. I spent the dark moments asking difficult questions. How would I share the news with my friends and family? Did we have the resources my family would need if I was gone? Could I be generous and stoic through my own suffering and decline, or would sadness overwhelm me? In other moments, I could push all that away and live and feel as if nothing had changed; I could laugh and smile and throw myself into a project, a problem, or a patient's story with the same energy and curiosity as always. The biopsy was the last step. Was the flask filled with poison or not?

In Schrödinger's thought experiment, the cat is a neutral object, present to illustrate a scientific conundrum. Schrödinger was focused on observation, not the observer — and yet it is the observer who is most affected by opening the box. Especially if it's not just any cat, but the one that curls up in that observer's lap and purrs with every touch. Especially if the cat is as beloved as the observer's own health or life.

I began to think of the many patients I'd seen over the years whose behavior was little different from my own. People who had ignored symptoms and postponed tests. People who had dismissed clear evidence of the potential harm they faced. I had always tried to understand why they made the choices they did, but I rarely found their reasons rational. Since my encounter with the bone drill, I've had to reconsider my bias. There is something quite rational and deeply human about lingering in a world that preserves the possibility that what you love remains alive and unchanged, rather than entering a world that may contain the certainty that it does not. As long as it remains unopened, a box could hold a live cat.

My own verdict returned a week later. There was no cancer. With some minor adjustments, I could return to my convenient, complacent assumption that in the things that matter most, tomorrow would be little different from today. I could return, as well, to my practice and my patients with a new awareness that a test is never just a test. Each contains a hammer hovering over a flask of poison.

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