

# Quantum Nudge

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As an actuary himself, Edward Traske loved actuarial jokes.

Not the ones that were slightly rehashed accountant or lawyer jokes; those, he could do without. But the ones which portrayed actuaries as caring more about numbers and models than people? The ones that showed actuaries as extreme creatures of habit? Those were perfect. He didn't even mind them if they portrayed actuaries as socially or physically awkward, because truth be told, he fit those descriptions.

Yes, Edward Traske loved actuarial jokes. But he wasn't laughing now.

He was walking from his front door to the street where his car was parked, and he somehow tripped on a wet newspaper. He wasn't aware any of his neighbors still got the newspaper delivered, yet somehow one was blown by the morning's thunderstorm onto the path he walked every day.

Edward assessed the situation. He landed on his knee, which wasn't really hurting, though he was sure he would be feeling it later. There was no blood. But there was a huge tear in his khakis, and now he had to change.

Fortunately, Edward had three identical pairs of khakis in his closet. He was an actuary, after all.

Back inside, Edward took off the ruined pants and prodded his knee, finding no apparent damage. As he did, he thought about how he was having a string of bad luck. This morning, his alarm clock went off early; he had no idea how it happened. And yesterday, he managed to stick his finger on an uncapped pen in his coat pocket. Actuaries in jokes were often absent-minded, but this was ridiculous.

It didn't take long for Edward to change clothes, lock up, and head to his car, this time avoiding any newsprint landmines. Coincidentally, he was getting on the road at the exact time he always did, which meant smooth sailing down the freeway. Smooth sailing, that is, until a truck on the other side of the freeway lost control and crossed the median, right in front of him.

The next thing he noticed, Edward Traske was sitting in an unusual chair. The material was firm but surprisingly comfortable, nothing like the chair in his office. He was sitting at a slight recline, so he

could see he was wearing his favorite khakis. The room he was in was windowless and painted a gray-green color. He spotted another chair, probably like the one he was sitting in, but nothing else.

This was all very unusual, because he had clear memories of an imminent automobile accident, but nothing after that.

There was a door at the other side of the room, which opened, admitting a man who looked like he could have walked out of the last actuarial conference. Someone who was presenting, since he was wearing a sharp gray business suit.

“Good morning, Edward Traske. My name is Michael Bush. Welcome to The Agency.”

“The Agency? As in....”

“Not any agency you’ve heard of. Our focus is on temporal monitoring and correction, so we only use the term The Agency. In broad terms, there is a temporal cold war going on, and we’ve recruited you as a covert agent.”

“I’m pretty sure I just died,” Edward said. “So how is that going to work?”

“You did. Today was the day you were supposed to become just another actuarial statistic. The investigators will find a genetic clone of your body in the wreck.”

“Like in the book *Millennium*?”

“Oh, good,” Michael said, looking relieved. “If you’re familiar with fictional portrayals of time travel, it’s going to make explaining this a whole lot easier. And I’m glad you said book, because the movie was terrible.”

“Never saw it.”

“And speaking of films, let’s go into the theater.”

Michael led Edward through a plain hallway, one that could have been found in any office building. The room they then entered looked more like a school classroom than a theater, but it did have a pull-down projection screen. Harsh white light shone upon it, coming from a slide projector. Edward hadn’t seen the likes of this since his elementary school days. Michael motioned for Edward to have a seat, while he sat behind the slide projector.

“I’m surprised to see this old technology,” Edward commented. “Aren’t we in the future?”

“The first thing you will learn is that time loses its meaning when you can travel through time,” Michael replied. “You will see our current technology later, but understand that the people we recruit can be from as long ago as the early 20th century. Film and photography are the most consistently relatable media we have.

“I mentioned a temporal cold war before. You may be familiar with multiverse theory, or the idea that there are infinite parallel universes based on the results of infinite different choices. That may be the case, but there are overwhelming forces pulling the timeline to one of two outcomes, a world of control and tyranny, or a world of freedom and individuality. Some will see this as evidence of the divine, the classic battle of good versus evil. Others subscribe to the idea that the universe is a simulation, and we serve the role of hackers trying to rewrite the program. You will hear many more theories when you talk to your fellow agents. Regardless, we are all working towards keeping the world on the good timeline.

“The problem we face is that we can’t just keep going back to the same time. Through a mechanism we don’t understand, some changes are big enough to ‘lock in’ and resist any later efforts to change. The first of these was World War I, and major ones to follow include the Great Depression, World War II, and the Cold War. Even things like the opposition to nuclear power, multiple ethnic conflicts, and the rise of social media all show evidence of being engineered to happen. And when this happens, all we can do is mitigate the worst effects of the ‘new normal’.

“And because there are two groups working towards opposite ends, you can’t just change history by killing someone in childhood. The other side knows, as we do, who are the historically important people. They will make sure these people end up where they want. Our strategy, traditionally, was to influence the people who influenced the great men and women. But by the era we pulled you from, there was enough information on these people so that our foes can predict our targets.

“The one tactic that has the greatest chance of working is to find someone unknown and push them into becoming a new great person of history. We have computers running endless simulations, and hundreds of people are hypothesizing about the best way to change the future. We fear we are reaching another lock point, roughly 20 years after the date we pulled you from. And this is the reason we have recruited you.”

“You think I could influence someone? I’ve spent my life pricing life insurance,” Edward said.

“We know you are the right person. Because after years of work, The Agency predicts the best way to save the world is to elect an actuary as President of the United States.”

Edward paused for a moment. “I’m trying to think of someone with the temperament to be both an actuary and a politician. I’m not having any luck.”

“The ideal candidate to fill this role would be outgoing, comfortable speaking both to executives and to entry level people. Someone who inspires loyalty in the people he works with, who, as an example, could get someone to follow him to a new job. And because this is the USA, he would need money and connections, or at least access to them.”

Edward shook his head. There was only one actuary he had met who inspired that kind of loyalty in him, one who convinced him to move to Kansas, despite having no ties in the area. But he didn’t... wait a minute. “You’re talking about my boss,” Edward said.

Michael nodded and clicked a button on the slide projector. There, on the screen, was Edward’s boss, though looking much older. “Isaac J. Henderson served as president of the Society of Actuaries for the 2030-2031 term, while in semi-retirement from Kansas Life Assurance, where he was Chief Actuary. He made the centerpiece of his term the reform of government social insurance programs, wanting to find a way to share the burden of reform in a way to preserve these programs for the benefit of future generations. Like many others, he failed to convince Congress.”

Michael clicked through more slides, showing newspaper articles, scenes of protests, and later riots. “This is what will happen in the future, pulling heavily towards the bad timeline. These pictures illustrate a world where governments, first locally and then nationally, engage in cycles of behavior that can loosely be described as punishing one’s enemies, rewarding one’s friends, and looting the Treasury. We fear this would mark a lock point, and our computer simulations are not finding a way to shift the timeline back after this starts happening. But this future is not yet set in stone.

“Successful reform of programs like Social Security and Medicare could be the kind of shared sacrifice for the greater good that could inspire future generations to continue to work together. And most importantly, our foe is unlikely to have imagined this possibility.”

Michael turned to Edward. “Do you know why we think Isaac Henderson is the best choice?”

Edward hadn’t made the connection at first, but now he remembered. “His wife is from a prominent Kansas family.”

Michael clicked the next slide. “Right. Amanda Hall Henderson is from a family that’s been involved in Kansas politics since the 19th century. And while their wealth isn’t exceptional, it is more than enough to influence local races.”

“I take it you want me to push Isaac into politics. But how do I do that?” Edward asked.

“We have a plan with the best chance of success for Isaac Henderson. You will travel back to your own body, at various points in your past, and try to push Mr. Henderson toward that goal.”

“So, like *Quantum Leap*?”

“That’s a good analogy, but remember that the goal is to change the future while making the smallest waves possible. So this is more like a quantum nudge.”

Edward Traske spent two years studying. Fortunately, his previous profession prepared him well for this job.

The first thing Edward learned is that there were two kinds of time travel in The Agency. Physical travel was used sparingly, as it ran the risk of trapping the agent in the past. Interacting with people during physical travel was especially risky. His version, traveling back into one’s past self, was preferable, as one could interact with people without risking what was termed a “paradox bubble”.

He learned way more than he ever needed to know about the state of Kansas, its government and institutions, and the major players over a 40-year period. He studied the paths available to push Isaac Henderson to the presidency, with the best option starting from insurance commissioner and going to governor. Importantly, the agents discussed the changes that were likely in his own past, assuming he would continue to follow Isaac to his new jobs, as he did in his actual life.

The most critical part of Edward’s studies involved training his mind to handle the shock of “leaping”. He would have, essentially, two sets of memories, the current memories of his past body and the greater memories of his future self. He practiced techniques to engage his current memories, necessary to fit in, while safeguarding his full memories. From talking to other agents, he learned to expect what they called “the buzz”, the disorienting feeling of one’s future memories changing because of successfully changing the past. They described it as akin to waking from a particularly vivid dream.

Edward Traske again sat in an unusual chair, like when he first arrived at The Agency. This chair, however, was in a laboratory, surrounded by machines that would send his consciousness back into his past body. There were several technicians in the room, but Edward focused on Michael, who was guiding him.

“This is your final exam,” Michael said. “We will send you back to a notable event in your past. We will be able to see through your eyes and record what you see. You will complete your past task using your past memories, then shift to your current memories. Remember these instructions: When you finish, go to the nearest bathroom, then go to the furthest stall in that bathroom. There will be a paper behind the toilet with a series of questions written on it. Write down the correct answers to trigger your leap back.”

“But what if I don’t have a pencil?”

“Trust me, you will have a pencil.” And Michael pressed a large red button.

Nervous energy. That was the first thing Edward felt. Jitters, plus too much caffeine and sugar. Edward centered his mind, as he was trained, isolating his future memories and focusing on the present. The recent presidential election was fresh in his mind, but even fresher was a plethora of mathematical formulae and mnemonics. He was sitting at a table with just a Texas Instruments BA-35 calculator and several pencils. To his side, sharing the table, was a young woman, looking as nervous as he felt.

Edward’s final exam was an actuarial exam. And not just any exam, the big one. No matter how often the Society of Actuaries changed the exam names, he would forever remember this one as Exam 150. November 1996. He was working in Hartford at the time, and he remembered the exam center being at the University of Hartford.

The proctors dropped off an exam booklet and Scantron sheet, and shortly after began reading the instructions. And before long came the dreaded words. “Begin work.”

Edward remembered everything. He put pencil to paper, and the patterns learned from working hundreds of practice problems came back to him as if he had just learned them. In a way, he had.

He finished all the questions with twenty minutes to spare, leaving enough time to check some of his answers. When “Time for this exam has expired” was announced, Edward felt confident that he had passed.

The proctors passed by, collecting exam booklets and answer sheets in a cardboard box. With the number of exam takers, the stack of booklets was growing taller than the edges of the box.

“I think you need a bigger box,” Edward’s tablemate quipped as she watched.

Edward chuckled.

There was a thought pushing in the back of Edward’s mind, his future self, demanding to return. He centered himself, and his future thoughts surfaced. Remembering his mission, he headed to the bathroom and found the hidden paper. The questions on the paper pulled from his own future and the training he just had. To anyone else, they would be nonsensical. But Edward confidently answered them.

A slight pull, and Edward was back in that chair in the laboratory.

“Well done, Edward,” Michael said.

Edward was already missing his younger, healthier body.

Edward's first mission sent him to the summer of 2000. Isaac Henderson was at that time a VP in the pricing area, and he had hired Edward for an open position. He was in their Wednesday staff meeting, listening to one of his coworkers talk about the problems they were having getting rate increases approved for some of their health products.

At the end of the meeting, Edward stuck around to talk with Isaac. "Is it normal to have problems with rate filings in Kansas?" he asked. "Is it because the insurance commissioner is elected?"

"In my experience, insurance commissioners, even elected ones, leave the actuaries to do their jobs," Isaac replied. "But I wonder if you might be right in this case."

"It's a shame we can't get an actuary in that role."

"Most actuaries want nothing to do with politics," Isaac stated.

"I don't know. I think you could take all that glad-handing," Edward suggested. "And didn't you say your wife is from a political family?"

"She is, but she much prefers being a teacher."

"Well, we'll keep working on these filings, but if we don't get an actuarially sound objection soon, I might just ask you again to run for office."

Edward skipped forward in time, sort of like fast-forwarding, to continue to plant the idea of running for office. It became a running joke for Edward and Isaac, until one day it was no longer a joke. Edward felt his first buzz, and he took a large leap forward.

October 2007. Washington, D.C. Edward vaguely remembered this SOA Annual Meeting in his future memories, but in his current memories it was fresh. He was attending it as a staff actuary in the Kansas Department of Insurance, a position for which he was recruited by Isaac. He was at the Monday night reception, drink in hand, part of a large crowd orbiting around Isaac. Isaac was talking animatedly about Medicaid reform, expanding on his presentation from a session earlier that day.

Edward smiled. Isaac was clearly establishing a rapport with this group of men and women who he had just met. If he continued to work at this, he could actually be successful as a politician.

*“And hoping each time that his next leap will be the leap home.”*

Edward recalled the line from the original *Quantum Leap*. The plan was for him to keep leaping forward in his changed life, looking for other occasions where he could apply a small nudge. To leap home, back to The Agency, meant something had gone wrong.

Edward focused, bringing his future memories to the forefront of his mind. There were changes he would have to catalog, but his mission did not change. “What happened?” he asked.

Michael was by his side, and he helped Edward stand up. “The simulations are still pushing for an actuarial president. But now, we are now showing no path for Isaac Henderson. We’re going to need to find a new agent to work with our second choice.”

“What did I do wrong?” Edward asked.

“You didn’t do anything wrong, as near as we can tell. But something happened that the simulations did not predict. And what that is, we don’t know.”

“Then can I go back and try again?”

“We haven’t reached a lock point, which is the only good news. But there’s no reason to go back unless we have a plan,” Michael said. “Edward, you knew Isaac for decades, and the smartest computer can’t match the insights of direct human contact. We’ll train you on the databases, and you can look for something the computers missed.”

Looking at the impact of his actions made Edward depressed. He didn’t save the world. All he accomplished was making Isaac’s life worse. Isaac no longer became president of the Society of Actuaries, though he still served on the board. Instead of a long and successful career at Kansas Life Assurance, he went from the Kansas Department of Insurance to jobs at three companies in Massachusetts and Connecticut.

Despite being centuries in the future, the computer interfaces at The Agency were much like what Edward was used to. The difference was the computers understood spoken English, so he didn’t need to know any programming language to do complicated queries and comparisons. The problem was, not only did he have access to the equivalent of several internets’ worth of data, he had it for thousands of timelines, and that was just counting the ones created since he started working for The Agency.



Asking the computer to compare the timelines that changed had its own problems, as things changed so significantly. Articles about Isaac's time at the Department of Insurance had no equivalent in the past, while his mentions in communications from the Society of Actuaries were considerably fewer.

Asking the computer to show all differences generated far too much data to process. Edward asked for it to be sorted by relevance. Then he got to work.

"Knock knock."

Edward looked up from the computer screen to see Michael standing at the doorway.

"The new agent's here," Michael said.

"That was today?" Edward said.

"Yeah. We've recruited someone from California, about a year after you. Jennifer is giving her the whole 'welcome to the future' spiel. If that goes well, we'll introduce her in about 30 minutes."

"I could use the break," Edward said. "Things went okay?"

"Yeah, much better than your recruitment."

"There were problems with my recruitment?" Edward asked.

"Yes. The computer set the strategy, chose the person best able to execute the strategy, then we found you as the best agent to make it work. But then your death date, which was age 45 years, 8 months, 13 days for thousands of timelines, started fluctuating. We eventually found you left for work early in these other timelines, so we introduced the wet newspaper as the minimal nudge to put things on track."

"I tripped and ruined my pants. I liked those pants," Edward grumbled.

"Sorry about that. So yeah, the wet newspaper ensured you died at the right time, and the pen in your pocket was the way we collected your DNA to grow the clone body."

"And the alarm clock?"

"What alarm clock?" Michael asked.

"I remember my alarm waking me up early. Did you change that?"

"I'm nearly certain we didn't."

Edward scratched his chin. "Send my apologies to the new recruit. I have something I need to research."

Something bothered Edward about the pictures he could find of Isaac in his later years. At first, he chalked it up to the elder actuary looking less happy. Something told him there was something else going on.

There were still pictures of Isaac Henderson at actuarial events, even if he no longer held the more prominent role. By expanding the search to include social media, Edward found new pictures of future Isaac. After looking at them, he saw what was missing.

Isaac's wife.

The computer confirmed that in the current timeline, Isaac divorced in 2009. That would certainly explain why he didn't pursue politics further. To Edward, it seemed like an unpredictable butterfly effect. But during his training, every agent he learned from said there was no such thing as an unpredictable butterfly effect, just futures with greater uncertainty. One of the newer agents actually said "This isn't *The Butterfly Effect*".

Edward didn't care much for that movie. In one of its timelines, the main character turned into a jerk, for seemingly no reason. Edward knew Isaac through two timelines, and he could see no reason for him to change like that.

If these things were both true, there was one possibility left. The Agency wasn't the only group trying to change the past.

Edward addressed the computer. "I want to review all of my leaps to the past, up until December 2010. I'm looking for people who I saw multiple times. Split the list between people who worked with me and Isaac Henderson, and people who didn't. I want to start with the latter. List encounter dates and organize by relevance."

Since he asked to only see people he didn't work with, it was not surprising that most of the encounter dates were from various actuarial meetings. Some of them also appeared on his test leap to the actuarial exam in 1996. He hadn't intended to include that, but as long as it was there, he'd keep the data.

“Let’s reduce the significance of the 1996 encounter and increase the significance of anyone on this list directly interacting with Isaac Henderson or attending a session at which he was presenting.”

The list of names shifted around.

“Let’s classify each of these encounters, highlighting the ones with me or Isaac.” More words appeared on the screen. He motioned to a couple of names. “They presented on the same panel. That seems normal, so move it down the list.”

Edward noticed one pattern, that there were several people who were encountered more often, or only, once Isaac became insurance commissioner. To some extent, that made sense; if your work involved product filing or reporting, you would want to focus your continuing education on the latest news from the regulatory side. A few of these names had multiple different encounters. “Attended session.” “Attended session and asked question.” “Talked in hallway.” “Talked during reception.”

This was going to take some time. “Start with the first name on the list. Create a play list of the encounters, in reverse chronological order.”

The first name had twenty hours of footage. Fortunately, Edward could fast forward.

It was strange seeing people truly passionate about actuarial work. To go to a session, ask detailed questions about the finer points of some actuarial topic, and then be genuinely happy after getting an answer... well, that was never really Edward’s calling. He saw the same passion that these actuaries possessed in some of the older people in The Agency. And given that he was enjoying even this tedious work, maybe time-traveling secret agent was his calling as well.

The fifth name Edward reviewed was different. The young woman was asking detailed questions, talking business even during the reception, all much like the first four people. But that spark wasn’t there. As he fast forwarded through the virtual tape and the woman appeared younger, she started looking familiar. The end of the tape had a four-and-a-half-hour section, and that was when Edward recognized her.

She was the nervous student he sat next to during that sitting of Exam 150!

“I wonder if she passed,” Edward mused.

“Allison Clark passed Exam 150 during the November 1996 sitting, according to the list of passing candidates published by the Society of Actuaries,” the computer replied.

“While you’re at it, give me any biographical information you can find about her, in written form,” Edward continued.

The computer complied, but nothing stuck out to Edward as he studied the data. He cross-referenced various details, finding nothing special. He was a bit startled when he heard “Time for this exam has expired” from the visual replay he had left running in the background.

Then he heard the joke Allison made, and something clicked in his memory.

Edward Traske stood at the front of the room, looking over his fellow agents. Given how much The Agency’s building resembled an office building from his life, Edward couldn’t help but think of the first time he had given a big presentation to the larger actuarial team. Michael Bush was the equivalent of his direct supervisor, and the older people in the room were the department vice presidents. Just like back then, it wasn’t enough to get the right answer. He had to convince the others his answer was right.

“As you know, our attempt to guide the life of Isaac Henderson, with the goal of creating a U.S. president who could save Medicare and Social Security, experienced a failure, due to an unpredictable butterfly effect.”

“There is no such thing as an unpredictable butterfly effect,” interjected one of the experienced agents.

“And you’re right. Since there’s no butterfly effect, the only other explanation is enemy action. And I think I’ve found the enemy agent.”

That got everyone in the room to lean forward.

This time, Edward controlled what was on the screen, though he used The Agency’s computers to project the image. “During the periods when I leapt back, trying to change the past of Isaac Henderson, I frequently encountered an actuary named Allison Clark in various public settings. This is not unusual in and of itself; the actuarial profession is a small one, after all. The frequency is what is suspicious, but it’s just that, suspicion.

“However, we first crossed paths during an actuarial exam early in my career. This was the moment you sent me back as my test, and so we can watch the scene as recorded through my eyes.”

Edward played the scene as he saw it, mostly focused on the exam proctor struggling to carry his large stack of exam booklets. He shifted his focus to Allison when she said “I think you need a bigger box”.

No one else in the room reacted.

Finally, Michael spoke. "What does the *Jaws* joke have to do with anything?" he asked. The others in the room nodded.

"What year were you pulled from?" Edward asked him.

"My death date was in 1990," Michael replied.

"I see why you thought about *Jaws*. But if she were adapting that joke, she would have said 'You're gonna need a bigger box.' It's possible she messed up the quote badly. Or she got it right, and she was referencing a popular commercial with the Taco Bell chihuahua."

Edward played that commercial, showing the chihuahua trying to ensnare Godzilla with some tacos and a box trap. "I think I need a bigger box" was the punchline.

"The problem is, this commercial is from 1998, so only someone from the future would know it.

"When you first brought me here, Michael told me how your strategy is to change the world by creating a new great person, and how you were certain the enemy would never think about the possibility that an actuary could be this person. I'm telling you that it's likely the enemy reached the same conclusion as you and even figured out the best person to reach the goal. And given the possible interference with my intended day of death, they may also have guessed you would recruit me."

"We'll need some time to think about this," the senior agent said. "Good thing we have a time machine."

"You discovered this, Edward. What remedy do you recommend?" Michael said.

"If Allison Clark is trying to sabotage Isaac Henderson, she will need access to him, which requires her to be an actuary, which requires her to pass exams. That's the smallest nudge," Edward replied. "Since I suspect she tried to sabotage us by changing my alarm clock, let's return the favor."

One nudge. One change. One alarm turned off disrupted one enemy agent's plans, and the future shifted to just what The Agency's computers originally predicted. Isaac Henderson followed two terms as insurance commissioner by winning the gubernatorial election, then winning reelection four years later by a wide margin. Two years later, with his political fortunes as high as they could be, he rose to the top of a crowded primary field, securing the nomination and, in November, the election. The next January, he stood on stage and took the oath of office, his loving wife beside him.

Edward watched President Henderson's address to the nation, where he pushed for his reforms to Social Security and Medicare. Coming just after Veterans Day, Henderson first highlighted how these programs provided for the needs of the Greatest Generation, and then compared his reform plan to the united effort involved in winning World War II.

"It took more than the efforts of our country's brave soldiers and sailors to win the war. It took the efforts of the women and men who stepped up and worked the factories that supplied tanks, planes, and materiel for the troops. And it took the efforts of every man, woman, and child on the home front who scrimped, who saved, who recycled, who did without. Our victory could never have happened without this unity, without this shared sacrifice.

"Since this time, America has never stopped doing great things. America has never stopped doing tough things. But for too long, we've allowed ourselves to believe that we can do great things, tough things, and place the burden entirely on others. More taxes, for other people. Cut subsidies, for other businesses.

"Some would have you believe programs like Social Security and Medicare are too hard to fix. They're not. It's just a matter of math. Every year, we receive a report about how the math has changed. And every year, politicians kick the can down the road. Because it's political will that's hard, not math.

"I call upon all Americans to think about the future, to save these programs for future generations. I call for unity. And we can't do it without a little shared sacrifice."

"Pretty powerful, huh?"

Edward jumped, not having noticed Michael enter the room.

"I'm a bit surprised it worked," Edward said.

"Sometimes, all it takes is someone who thinks differently. And it's hard to think more differently than an actuary."

Edward laughed. Edward Traske loved actuarial jokes, not because they were funny, but because they were true.