The Data-Driven Life

By GARY WOLF

Humans make errors. We make errors of fact and errors of judgment. We have blind spots in our field of vision and gaps in our stream of attention. Sometimes we can't even answer the simplest questions. Where was I last week at this time? How long have I had this pain in my knee? How much money do I typically spend in a day? These weaknesses put us at a disadvantage. We make decisions with partial information. We are forced to steer by guesswork. We go with our gut.

That is, some of us do. Others use data. A timer running on Robin Barooah's computer tells him that he has been living in the United States for 8 years, 2 months and 10 days. At various times in his life, Barooah — a 38-year-old self-employed software designer from England who now lives in Oakland, Calif. — has also made careful records of his work, his sleep and his diet.

A few months ago, Barooah began to wean himself from coffee. His method was precise. He made a large cup of coffee and removed 20 milliliters weekly. This went on for more than four months, until barely a sip remained in the cup. He drank it and called himself cured. Unlike his previous attempts to quit, this time there were no headaches, no extreme cravings. Still, he was tempted, and on Oct. 12 last year, while distracted at his desk, he told himself that he could probably concentrate better if he had a cup. Coffee may have been bad for his health, he thought, but perhaps it was good for his concentration.

Barooah wasn't about to try to answer a question like this with guesswork. He had a good data set that showed how many minutes he spent each day in focused work. With this, he could do an objective analysis. Barooah made a chart with dates on the bottom and his work time along the side. Running down the middle was a big black line labeled "Stopped drinking coffee." On the left side of the line, low spikes and narrow columns. On the right side, high spikes and thick columns. The data had delivered their verdict, and coffee lost.

He was sad but also thrilled. Instead of a stimulating cup of coffee, he got a bracing dose of truth. "People have such very poor sense of time," Barooah says, and without good time calibration, it is much harder to see the consequences of your actions. If you want to replace the vagaries of intuition with something more reliable, you first need to gather data. Once you know the facts, you can live by them.

Five years ago, Ben Lipkowitz, who is now 28, was living with some friends in Bloomington, Ind., and he found himself wondering how much time he spent doing one of his roommates' dishes. Lipkowitz had a handheld electronic datebook that he purchased on a trip to Tokyo, and on May 11, 2005, at 2:20 p.m., he started using it to keep a record of his actions. Instead of entering his future appointments, he entered his past activities, creating a remarkably complete account of his life. In one sense this was just a normal personal journal, albeit in a digital format and unusually detailed. But the format and detail made all the difference. Lipkowitz eventually transferred the data to his computer, and now, using a few keyboard commands, he can call up his history. He knows how much he has eaten and how much he has spent. He knows what books he has read and what objects he has purchased. And of course, he knows the answer to his

original question. "I was thinking I was spending an hour a day cleaning up after this person," Lipkowitz says. He shrugs. "It turned out it was more like 20 minutes."

Another person I'm friendly with, Mark Carranza — he also makes his living with computers — has been keeping a detailed, searchable archive of all the ideas he has had since he was 21. That was in 1984. I realize that this seems impossible. But I have seen his archive, with its million plus entries, and observed him using it. He navigates smoothly between an interaction with somebody in the present moment and his digital record, bringing in associations to conversations that took place years earlier. Most thoughts are tagged with date, time and location. What for other people is an inchoate flow of mental life is broken up into elements and cross-referenced.

These men all know that their behavior is abnormal. They are outliers. Geeks. But why does what they are doing seem so strange? In other contexts, it is normal to seek data. A fetish for numbers is the defining trait of the modern manager. Corporate executives facing down hostile shareholders load their pockets full of numbers. So do politicians on the hustings, doctors counseling patients and fans abusing their local sports franchise on talk radio. Charles Dickens was already making fun of this obsession in 1854, with his sketch of the fact-mad schoolmaster Gradgrind, who blasted his students with memorized trivia. But Dickens's great caricature only proved the durability of the type. For another century and a half, it got worse.

Or, by another standard, you could say it got better. We tolerate the pathologies of quantification — a dry, abstract, mechanical type of knowledge — because the results are so powerful. Numbering things allows tests, comparisons, experiments. Numbers make problems less resonant emotionally but more tractable intellectually. In science, in business and in the more reasonable sectors of government, numbers have won fair and square.

For a long time, only one area of human activity appeared to be immune. In the cozy confines of personal life, we rarely used the power of numbers. The techniques of analysis that had proved so effective were left behind at the office at the end of the day and picked up again the next morning. The imposition, on oneself or one's family, of a regime of objective record keeping seemed ridiculous. A journal was respectable. A spreadsheet was creepy.

And yet, almost imperceptibly, numbers are infiltrating the last redoubts of the personal. Sleep, exercise, sex, food, mood, location, alertness, productivity, even spiritual well-being are being tracked and measured, shared and displayed. On MedHelp, one of the largest Internet forums for health information, more than 30,000 new personal tracking projects are started by users every month. Foursquare, a geo-tracking application with about one million users, keeps a running tally of how many times players "check in" at every locale, automatically building a detailed diary of movements and habits; many users publish these data widely. Nintendo's Wii Fit, a device that allows players to stand on a platform, play physical games, measure their body weight and compare their stats, has sold more than 28 million units.

Two years ago, as I noticed that the daily habits of millions of people were starting to edge uncannily close to the experiments of the most extreme experimenters, I started a Web site called the Quantified Self with my

colleague Kevin Kelly. We began holding regular meetings for people running interesting personal data projects. I had recently written a long article about a trend among Silicon Valley types who time their days in increments as small as two minutes, and I suspected that the self-tracking explosion was simply the logical outcome of this obsession with efficiency. We use numbers when we want to tune up a car, analyze a chemical reaction, predict the outcome of an election. We use numbers to optimize an assembly line. Why not use numbers on ourselves?

But I soon realized that an emphasis on efficiency missed something important. Efficiency implies rapid progress toward a known goal. For many self-trackers, the goal is unknown. Although they may take up tracking with a specific question in mind, they continue because they believe their numbers hold secrets that they can't afford to ignore, including answers to questions they have not yet thought to ask.

Ubiquitous self-tracking is a dream of engineers. For all their expertise at figuring out how things work, technical people are often painfully aware how much of human behavior is a mystery. People do things for unfathomable reasons. They are opaque even to themselves. A hundred years ago, a bold researcher fascinated by the riddle of human personality might have grabbed onto new psychoanalytic concepts like repression and the unconscious. These ideas were invented by people who loved language. Even as therapeutic concepts of the self spread widely in simplified, easily accessible form, they retained something of the prolix, literary humanism of their inventors. From the languor of the analyst's couch to the chatty inquisitiveness of a self-help questionnaire, the dominant forms of self-exploration assume that the road to knowledge lies through words. Trackers are exploring an alternate route. Instead of interrogating their inner worlds through talking and writing, they are using numbers. They are constructing a quantified self.

UNTIL A FEW YEARS ago it would have been pointless to seek self-knowledge through numbers. Although sociologists could survey us in aggregate, and laboratory psychologists could do clever experiments with volunteer subjects, the real way we ate, played, talked and loved left only the faintest measurable trace. Our only method of tracking ourselves was to notice what we were doing and write it down. But even this written record couldn't be analyzed objectively without laborious processing and analysis.

Then four things changed. First, electronic sensors got smaller and better. Second, people started carrying powerful computing devices, typically disguised as mobile phones. Third, social media made it seem normal to share everything. And fourth, we began to get an inkling of the rise of a global superintelligence known as the cloud.

Millions of us track ourselves all the time. We step on a scale and record our weight. We balance a checkbook. We count calories. But when the familiar pen-and-paper methods of self-analysis are enhanced by sensors that monitor our behavior automatically, the process of self-tracking becomes both more alluring and more meaningful. Automated sensors do more than give us facts; they also remind us that our ordinary behavior contains obscure quantitative signals that can be used to inform our behavior, once we learn to read them.

"When you have small, distributed battery-powered sensors, you want to collect all biometric data," says Ken Fyfe, one of the pioneers of wearable tracking devices. In the mid-'90s, Fyfe was teaching engineering at the

University of Alberta in Edmonton, where his specialty was acoustics and vibration. He was also a runner, in a family of runners. His sons were national competitors at 400 and 800 meters. At the time, runners who wanted to know more about the mechanics of their performance — their stride, their cadence, the way their motion changed as they grew tired — had to go into a lab and be filmed. "You would run in a room on a treadmill with reflective stickers on your hips, knees, ankles and feet," Fyfe recalls.

Taking video of people in motion, and then analyzing the video, seemed like a roundabout way to get data. Why not use an accelerometer, which can directly measure changes in speed and direction? Accelerometers had long been used in industry and cost several hundred dollars each. Then accelerometers were developed to trigger the air bags in cars. Massive purchases in the automotive industry drove the cost down. The size and power demands shrank, too. Suddenly, it seemed less crazy to put an accelerometer on your body.

Fyfe guessed that there would be plenty of interest in something like a personal speedometer, a wearable instrument that displayed how far you'd gone and your average speed. So he tried to invent one. "I worked on it every weekend for three years," Fyfe says. He put accelerometers into a molded plastic insert. The insert fit into a shoe, and data were transmitted wirelessly to a sports watch. But there was a problem. The numbers produced by a motion sensor don't necessarily say anything about a runner's pace and distance. They give you the acceleration of a runner's foot — that's all. Some method — a formula or algorithm — is needed to translate the data into the information you want, and the method must work for almost everybody under a wide range of conditions: stopping and starting, jumping over a curb, limping because of an injury. Developing these algorithms took up most of Fyfe's time during the years he perfected his system.

Thanks to faster computers and clever mathematical techniques, Fyfe and other inventors are turning messy data from cheap sensors into meaningful information. "The real expertise you need is signal processing and statistical analysis," says James Park, the chief executive and co-founder of Fitbit, a company that makes a tracker released late last year. The Fitbit tracker is two inches long, half an inch wide and shaped like a thick paperclip. It tracks movement, and if you wear it in a little elastic wristband at night, it can also track your hours of sleep. (You are not completely still when sleeping. Your pattern of movement, however, can be correlated with sleeping and waking, just as the acceleration of a runner's foot reveals speed.) Park and his partner, Eric Friedman, first showed their prototype at a San Francisco business conference in the summer of 2008. Five weeks later, Park and Friedman, who are both 33, had $2 million in venture capital, and they were flying back and forth to Singapore to arrange production. Last winter they shipped their first devices.

At nearly the same time, Philips, the consumer electronics company, began selling its own tiny accelerometer-based self-tracker, called DirectLife, which, like the Fitbit, is meant to be carried on the body at all times. Zeo, a company based in Newton, Mass., released a tracker contained in a small headband, which picks up electrical signals from the brain, and uses them to compile the kind of detailed record of light sleep, deep sleep and REM sleep that, until now, was available only if you spent the night in a sleep-research clinic. Lately I've been running into people who say they wear it every night. And Nike recently announced that its

Nike+ system, one of the first personal speedometers, has been used by more than 2.5 million runners since its release in 2006.

Ken Fyfe's accelerometer-based tracking system is used with sports watches by Adidas and Polar. In 2006 he sold his company, Dynastream, for $36 million to Garmin, which makes navigation equipment commonly used in cars and airplanes and which is now branching out into personal tracking. Fyfe's former company stayed in Alberta, where it continues to sell tracking components. A low-power data-transmission protocol they invented is in new blood-pressure cuffs, glucose monitors, blood-oxygenation sensors, weight scales and sleep monitors, all of which are aimed at the consumer market.

Web entrepreneurs like to talk about democratizing communication. Fyfe's dream is to democratize objective research on human subjects. "Until we came up with this technology, you couldn't do this kind of analysis unless you could get into a lab," he says. "Now you can."

At the center of this personal laboratory is the mobile phone. During the years that personal-data systems were making their rapid technical progress, many people started entering small reports about their lives into a phone. Sharing became the term for the quick post to a social network: a status update to Facebook, a reading list on Goodreads, a location on Dopplr, Web tags to Delicious, songs to Last.fm, your breakfast menu on Twitter. "People got used to sharing," says David Lammers-Meis, who leads the design work on the fitness-tracking products at Garmin. "The more they want to share, the more they want to *have* something to share." Personal data are ideally suited to a social life of sharing. You might not always have something to say, but you always have a number to report.

This is how the odd habits of the ultrageek who tracks everything have come to seem almost normal. An elaborate setup is no longer necessary, because the phone already envelops us in a cloud of computing. This term, "the cloud," has some specialized meanings among software architects, but fundamentally the cloud is just a poetic label for the global agglomeration of computer resources — the processors, hard drives, fiber-optic cables and so on — that allow us to access our private data from any Internet connection. We entrust all kinds of things to the cloud: our mail and our family photographs; the places we go and the list of people we call on the phone. When Jeff Clavier, the founder of SoftTech VC, a Silicon Valley venture capital firm, invested in a small financial company called Mint (now part of Intuit), he was warned that ordinary people were unlikely to trust their bank passwords and credit-card details to the cloud. "About 1.5 million people did it," Clavier says.

One of the reasons that self-tracking is spreading widely beyond the technical culture that gave birth to it is that we all have at least an inkling of what's going on out there in the cloud. Our search history, friend networks and status updates allow us to be analyzed by machines in ways we can't always anticipate or control. It's natural that we would want to reclaim some of this power: to look outward to the cloud, as well as inward toward the psyche, in our quest to figure ourselves out.

SOPHIE BARBIER, a 47-year-old teacher in Palo Alto, is a cyclist who regularly logs her time, distance and heart rate during a ride. "Training logs have been around forever," she told me. "But the more variables I

added, the more curious I got." Along with her cycling stats, Barbier began scoring her mood, sleep and ability to focus, as well as her caffeine consumption, and noting the days her menstrual cycle began and ended.

After surgery for a back problem, Barbier had trouble sleeping. On CureTogether, a self-tracking health site, she learned about tryptophan, a common amino acid available as a dietary supplement. She took the tryptophan, and her insomnia went away. Her concentration scores also improved. She stopped taking tryptophan and continued to sleep well, but her ability to concentrate deteriorated. Barbier ran the test again, and again the graph was clear: tryptophan significantly increased her focus. She had started by looking for a cure for insomnia and discovered a way to fine-tune her brain.

It is tempting to dismiss reports of such experiments as trivial anecdotes, or the placebo effect. I took Barbier's results to a friend of mine, Seth Roberts, an emeritus professor of psychology at the University of California, Berkeley, and an expert on self-experimentation. "There is a large difference between what Barbier did and the minimal story of somebody who takes a pill looking for a certain effect and then finds it," he pointed out. "First, she wrote the numbers down, so the results are not subject to memory distortion. Second, she changed the conditions several times. Every switch is a test of her original theory."

Roberts told me about his own method of measuring mental changes, a quick test he programmed on his computer that involves 32 easy arithmetic problems. The test takes about three minutes, and he has found that it can detect small changes in cognitive performance. He has used his self-tracking system to adjust his diet, learning that three tablespoons daily of flaxseed oil reliably decreases the amount of time it takes him to do math. Consuming a lot of butter also seems to have a good effect.

Self-experiments like Barbier's and Roberts's are not clinical trials. The goal isn't to figure out something about human beings generally but to discover something about yourself. Their validity may be narrow, but it is beautifully relevant. Generally, when we try to change, we simply thrash about: we improvise, guess, forget our results or change the conditions without even noticing the results. Errors are possible in self-tracking and self-experiment, of course. It is easy to mistake a transient effect for a permanent one, or miss some hidden factor that is influencing your data and confounding your conclusions. But once you start gathering data, recording the dates, toggling the conditions back and forth while keeping careful records of the outcome, you gain a tremendous advantage over the normal human practice of making no valid effort whatsoever.

I recently received an e-mail message from a 26-year-old filmmaker named Toli Galanis, who keeps track of about 50 different streams of personal data, including activities, health, films watched and books read, the friends he talks with and the topics they discuss. While Galanis acknowledged that he gets pleasure from gathering data and organizing it intelligently, it was a different aspect of his report that caught my attention. "I know that immediately after watching a bad movie I am more apt to be negative about my career prospects as a filmmaker," he wrote, explaining that tracking has made him better able to detect the influence of seemingly trivial circumstances on his mood and decisions.

The idea that our mental life is affected by hidden causes is a mainstay of psychology. Facility in managing the flow of thought and emotion is a sign of happiness and good adjustment. But how is it done? Nearly every therapeutic prescription involves an invitation to notice, to pay attention. Once we have a notion in our sights, we can attack it with an arsenal of tools: cognitive, psychoanalytic, even spiritual. But none of these will tell us if we've missed something. You may simply have failed to notice a debilitating habit, a negative correlation, a bad influence.

Galanis's realization that bad movies subject him to professional discouragement is the type of insight that will seem accessible to anybody blessed with a modest amount of self-awareness; finding it is no more difficult than catching sight of a dollar in the street and picking it up. But for every one you grab, how many do you overlook?

It's not only the context of our thoughts that escapes us. Our actions do, too. Since 2004, Terry Paul, an educational entrepreneur and philanthropist, has been working on a digital device that tucks into specially designed toddlers' clothing and can be used to predict language development through tracking the number of conversational exchanges a child has with adults. It cost Paul $32 million to perfect the system that takes the noisy sounds of a baby's environment and translates it into reliable data. As a commercial enterprise, it was unsuccessful. His device, called the LENA monitor, is used for academic research but never took off as a consumer product. When I tell parents about it, most of them are horrified. They imagine a nightmare of surveillance and an inducement to neurotic competition: who wants a digital recorder that grades you on how you talk to your kid?

Were we to submit to such a test, however, many of us would fare poorly. Parents, in fact, overestimate how much they talk to their preverbal children. Users of the LENA monitor can be awkwardly surprised. A mother I spoke with recently began monitoring after her daughter was prescribed a seizure medication that was associated with language delays. "It became very clear to us that my husband's words were less than mine," she said. He needed to try to talk to his daughter more. Until he saw the data, he had no idea that his attention was wandering.

Of course, sometimes we fail to notice what we do because we are motivated not to notice it. We are ashamed of ourselves, so we lie to ourselves. Shaun Rance started tracking his drinking two years ago, after his father was given a diagnosis of end-stage liver disease. He didn't pledge to stop drinking; he didn't do a searching moral inventory; he just started counting, using the anonymous Web site drinkingdiary.com. He found that his externalized memory was very powerful. Having a record of every drink he took sharpened his awareness and increased his feeling of self-mastery — and reduced his drinking. Because his tally is held by a machine, he doesn't feel any of the social shame that might make him, consciously or not, underestimate his drinking. "I don't lie to the diary," he says. After all, it is silly to posture in front of a machine. The tracking system is an extension of a basic faculty of Rance's consciousness, there to remind him where he stands, and it does its work without emotion. As far as he's concerned, that's a virtue.

There may be new domains of our biology that we can incorporate into our sense of self. "We know about asleep, awake, hungry, depressed, cold, drowsy, nauseous," says Dave Marvit, a vice-president at Fujitsu Laboratories of America, where he is leading a research project on self-tracking. "But what about hypoxic, anemic, hyperglycemic?" If we had a gentle signal about how much sugar was in our blood, would we change how we ate? Would it change how we feel?

Drinking. Talking. Being discouraged by a movie. Giving a moment's attention to a feeling of anger or elation, a small surge of energy or a metabolic dip. These are the materials of daily life. They barely stand out against the background of what we take for granted, and yet picking up these weak signals gives us leverage. Margaret Morris, a clinical psychologist and a researcher at Intel, recently ran a series of field trials using a mobile phone for tracking emotion. At random times, the phone rang and quizzed its owner about his or her mood. A man in one of Morris's studies reviewed the trends in his data and noticed that his foul mood began at the same time every day. He had a rushed transition from work to home. While unfinished tasks were still on his mind, new demands crowded in. The stress followed him for the rest of the evening. The data showed him where the problem was. With help, he learned to take a short mental break right there. He was much relieved.

The contrast to the traditional therapeutic notion of personal development is striking. When we quantify ourselves, there isn't the imperative to see through our daily existence into a truth buried at a deeper level. Instead, the self of our most trivial thoughts and actions, the self that, without technical help, we might barely notice or recall, is understood as the self we ought to get to know. Behind the allure of the quantified self is a guess that many of our problems come from simply lacking the instruments to understand who we are. Our memories are poor; we are subject to a range of biases; we can focus our attention on only one or two things at a time. We don't have a pedometer in our feet, or a breathalyzer in our lungs, or a glucose monitor installed into our veins. We lack both the physical and the mental apparatus to take stock of ourselves. We need help from machines.

Watch out for those machines, though. Humans know a special trick of self-observation: when to avert our gaze. Machines don't understand the value of forgiving a lapse, or of treating an unpleasant detail with tactful silence. A graph or a spreadsheet talks only in numbers, but there is a policeman inside all of our heads who is well equipped with punishing words. "Each day my self-worth was tied to the data," Alexandra Carmichael, one of the founders of the self-tracking site CureTogether, wrote in a heartfelt blog post about why she recently stopped tracking. "One pound heavier this morning? You're fat. Skipped a day of running? You're lazy. It felt like being back in school. Less than 100 percent on an exam? You're dumb." Carmichael had been tracking 40 different things about herself. The data she was seeing every day didn't respect her wishes or her self-esteem. It was awful, and she had to stop.

Electronic trackers have no feelings. They are emotionally neutral, but this very fact makes them powerful mirrors of our own values and judgments. The objectivity of a machine can seem generous or merciless, tolerant or cruel. Designers of tracking systems are trying to finesse this ambivalence. A smoking-cessation

program invented by Pal Kraft, a Norwegian researcher at the University of Oslo, automatically calls people who are trying to quit, asking them every day whether they've smoked in the last 24 hours. When the answer is yes, a recorded voice delivers an encouraging message: *All is well, take it easy, try again.* This mechanical empathy, barely more human than a recorded voice on the customer-service line, can hardly be expected to fool anybody. But a long line of research in human-computer interaction demonstrates that when machines are given humanlike characteristics and offer emotional reassurance, we actually do feel reassured. This is humbling. Do we really feel better when a computer pats us on the back? Yes, we do.

Jon Cousins is a 54-year-old software entrepreneur and former advertising executive who was given a diagnosis in 2007 of bipolar affective disorder. Cousins built a self-tracking system to help manage his feelings, which he called Moodscope; now used by about 1,000 others, Moodscope automatically sends e-mail with mood-tracking scores to a few select friends. "My life was changed radically," Cousins told me recently in an e-mail message. "If I got the odd dip, my friends wanted to know why." Sometimes, after he records a low score, a friend might simply e-mail: "?" Cousins replies, and that act alone makes him feel better. Moodscope is a blended system in which measurement is supplemented by human sympathy. Self-tracking can sometimes appear narcissistic, but it also allows people to connect with one another in new ways. We leave traces of ourselves with our numbers, like insects putting down a trail of pheromones, and in times of crisis, these signals can lead us to others who share our concerns and care enough to help.

Often, pioneering trackers struggle with feelings of being both aided and tormented by the very systems they have built. I know what this is like. I used to track my work hours, and it was a miserable process. With my spreadsheet, I inadvertently transformed myself into the mean-spirited, small-minded boss I imagined I was escaping through self-employment. Taking advantage of the explosion of self-tracking services available on the Web, I started analyzing my workday at a finer level. Every time I moved to a new activity — picked up the phone, opened a Web browser, answered e-mail — I made a couple of clicks with my mouse, which recorded the change. After a few weeks I looked at the data and marveled. My day was a patchwork of distraction, interspersed with valuable, but too rare, periods of focus. In total, the amount of uninterrupted close attention I was able to muster in a given workday was less than three hours. After I got over the humiliation, I came to see how valuable this knowledge was. The efficiency lesson was that I could gain significant benefit by extending my day at my desk by only a few minutes, as long as these minutes were well spent. But a greater lesson was that by tracking hours at my desk I was making an unnecessary concession to a worthless stereotype. Does anybody really believe that long hours at a desk are a vocational ideal? I got nothing from my tracking system until I used it as a source of critical perspective, not on my performance but on my assumptions about what was important to track.

People are not assembly lines. We cannot be tuned to a known standard, because a universal standard for human experience does not exist. Bo Adler, a young computer scientist at Fujitsu Laboratories of America, is one of the most committed self-trackers I've ever met: during his most active phase he wore a blood-pressure cuff, pulse oximeter and accelerometer all day long, along with a computer on a harness to collect the data. Adler has sleep apnea, and he is trying to figure it out. When he became too self-conscious going to the gym

in his gear, he wore a Google T-shirt to throw people off. Maybe he was a freak, but at least people could mistake him for a millionaire freak.

"Here's what they told me was the normal surgical course of treatment," Adler explained. "First they were going to cut out my tonsils, and if that didn't work, they would break my jaw and reset it to reposition my tongue, and finally they would cut out the roof of my mouth. I had one question: What if my case is different? They said, 'Let's try the standard course of treatment first, and if that doesn't work, then we'll know your case is different.' " Adler recognized what this proposal meant: it meant that his doctors had no cure for different. They wanted to see him as a standard case, because they have treatments for the standard cases. Before Adler underwent surgery, he wanted some evidence that he was a standard case. Some of us aren't standard, after all; perhaps many of us aren't.

Adler's idea that we can — and should — defend ourselves against the imposed generalities of official knowledge is typical of pioneering self-trackers, and it shows how closely the dream of a quantified self resembles therapeutic ideas of self-actualization, even as its methods are startlingly different. Trackers focused on their health want to ensure that their medical practitioners don't miss the particulars of their condition; trackers who record their mental states are often trying to find their own way to personal fulfillment amid the seductions of marketing and the errors of common opinion; fitness trackers are trying to tune their training regimes to their own body types and competitive goals, but they are also looking to understand their strengths and weaknesses, to uncover potential they didn't know they had. Self-tracking, in this way, is not really a tool of optimization but of discovery, and if tracking regimes that we would once have thought bizarre are becoming normal, one of the most interesting effects may be to make us re-evaluate what "normal" means.

"My girlfriend thinks I'm the weird person when I wear all these devices," Bo Adler says. "She sees me as an oddity, but I say no, soon everybody is going to be doing this, and you won't even notice."

Gary Wolf writes about science and social issues for Wired, where he is a contributing editor. This is his first article for the magazine.