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# The Nike Experiment: How the Shoe Giant Unleashed the Power of Personal Metrics

By Mark McClusky 06.22.09



The Nike+ team — (from left) Trevor Edwards, Michael Tchao, and Stefan Olander — at the company's headquarters in Beaverton, Oregon.

Image: Kate Gibb

LIVING BY NUMBERS



[How to Live by the Numbers: Exercise](#)



[How to Live by the Numbers: Nutrition](#)

**On June 6, 2008**, Veronica Noone attached a small sensor to her running shoes and headed out the door. She pressed start on her iPod and began keeping track of every step she took. It [wasn't a long run](#)—just 1.67 miles in 18 minutes and 36 seconds, but it was the start of something very big for her.

Since that day, she's run 95 more times, logging 283.8 miles in about 48 hours on the road. She's burned 28,672 calories. And her weight, which topped 225 pounds when she was pregnant, [has settled in](#) at about 145.

Noone knows all of that thanks to the sensor system, called [Nike+](#). After each run, she can sync her iPod to the Nike+ Web site and get a visual



How to Live by the Numbers: Health



Know Thyself: Tracking Every Facet of Life, From Sleep to Mood to Pain, 24/7/365.

representation of the workout—a single green line. Its length shows how far she's gone, and the peaks and valleys reflect her speed.

For a self-described "stat whore," there's something powerfully motivating about all the data that Nike+ collects. "It just made running so much more entertaining for me," says Noone, who blogs at [ronisweigh.com](http://ronisweigh.com). "There's something about seeing what you've done, how your pace changes as you go up and down hills, that made me more motivated."

Noone is now running four times a week and just did her first [10-mile race](#). She's training for a half marathon and hoping to do a full marathon by the end of the year. And she attributes much of her newfound fitness to the power of data. "I can log in to Nike+ and see what I've done over the past year," she says. "That's really powerful for me. When I started, I was running shorter and slower. But I can see that progression. I don't have to question what I've done. The data is right there in white and green."

Noone has joined the legion of people, from Olympic-level athletes to ordinary folks just hoping to lower their blood pressure, who are plugging into a data-driven revolution. And it goes way beyond Nike+. Using a flood of new tools and technologies, each of us now has the ability to easily collect granular information about our lives—what we eat, how much we sleep, when our mood changes.

And not only can we collect that data, we can analyze it as well, looking for patterns, information that might help us change both the quality and the length of our lives. We can live longer and better by applying, on a personal scale, the same quantitative mindset that powers Google and medical research. Call it Living by Numbers—the ability to gather and analyze data about yourself, setting up a feedback loop that we can use to upgrade our lives, from better health to better habits to better performance.

Few things illustrate the power and promise of Living by Numbers quite as clearly as the Nike+ system. By combining a dead-simple way to amass data with tools to use and share it, Nike has attracted the largest community of runners ever assembled—more than 1.2 million runners who have collectively tracked more than 130 million miles and burned more than 13 billion calories.

With such a huge group, Nike is learning things we've never known before. In the winter, people in the US run more often than those in Europe and Africa, but for shorter distances. The average duration of a run worldwide is 35 minutes, and the most popular Nike+ Powersong, which runners can set to give them extra motivation, is "Pump It" by the Black Eyed Peas.

The company couldn't have gathered all that information, and gained all those insights, if it hadn't reconfigured how runners approach their sport. Nike has done more than create a successful product; it has fundamentally changed the way more than a million people think about exercise.

A **brown plastic box**, emblazoned with Nike's iconic Swoosh logo, sits on the conference room table at the company's headquarters in Beaverton, Oregon. It's a clunky thing, the size of a thick paperback book, with a waist strap and two ports on the front that look like miniature speakers, lending it the air of a shrunken mid-'80s boom box.

It was called [the Nike Monitor](#), and it was the company's first attempt to sell runners a product that would tell them how far and fast they had run. The ports on the front weren't speakers—they were sonar detectors that would calculate a runner's speed, which would then be announced over a pair of headphones. The Monitor had to be strapped to the runner's waist facing forward. It may have been a good idea, but it was utterly impractical. Less than two years after [its 1987 launch](#), the Monitor was dropped from Nike's product lineup.

## How Nike+ Works

**TRACK THIS**

There is a vast universe of personal metrics to capture. Start with these:

**Vital Statistics**  
height // weight // age // birth weight // birth length

**TRACK THIS**

**Vital Signs**  
body temperature // pulse // blood pressure // respiratory rate

**TRACK THIS**

**Senses**  
visual acuity // auditory acuity

**TRACK THIS**

**Blood**  
glucose level // blood-alcohol level // hemoglobin level // HDL level // LDL level // liver enzyme level



### Capture

The shoe sensor's accelerometer measures the amount of time a runner's foot is on the ground, which is inversely proportional to speed. Transmitting at 2.4 GHz, the sensor sends data to a receiver that's either attached to an iPod nano or built into the second-gen iPod touch.



### Sync

After the workout, the iPod is synced to a computer running iTunes, which automatically sends the data, including start time, duration, and distance, to the Nike+ servers, formatted in a specially structured XML file that can also be read by third-party and open source apps.



### Share

Users can access their run history at NikePlus.com, browse through a graph that shows all their activity, and then drill down to details about each workout. If they need more motivation, they can enter challenges or set individualized goals, like running 100 miles in a month.

Illustration: L-Dopa

[Michael Tchao](#), head of Nike's Techlab, laughs. "You can imagine that this device, a little big, maybe not the most fashionable, wasn't the huge runaway success we had hoped. But even 20 years ago, we were experimenting in this space."

Despite Nike's shoe-centric business, its experiments in electronics continued. It launched a line of sports watches, made heart rate monitors, and even entered into an agreement with Philips to market an MP3 player. And Nike engineers constantly tinkered with what they referred to as a "smart shoe," a sneaker with built-in sensors that would automatically record the length and speed of your runs.

But a smart shoe, they realized, wasn't enough—you needed a device to save the data. By late 2004 the engineers started to notice that most of the runners they saw on Nike's campus were sporting white earbuds. The Apple iPod, which debuted in 2001, had mushroomed in popularity, with [sales doubling](#) every quarter. "Most runners were running with music already," says Nike president and CEO [Mark Parker](#). "We thought the real opportunity would come if we could combine music and data."

Nike engineers started to brainstorm. They cooked up various demos, even sketching a shoe with an embedded iPod. Finally, Parker picked up the phone and called a friend who worked at Apple—CEO Steve Jobs. After that call, teams from both companies got together at Nike headquarters. "We talked about the idea of Nike+ and actually had a little storyboard that showed it," says Tchao, who worked at Apple for 10 years before joining Nike. "Steve called it 'the speedometer for sports,' and we thought that was an interesting way to describe it. People drove around in cars before speedometers, and today you can't imagine driving without one."

Both companies saw profit potential if they could develop the system together, so the Nike and Apple teams each took on different parts of the project. Apple refined the sensor that Nike had prototyped, making it smaller and more durable. Nike focused on the shoes and the interface for the Web and the iPod. It created a simple system based around the idea of setting goals.

If a runner wants to run 5 miles, they enter that distance and press start. During the run, voice prompts let the runner know how fast they're moving, how far

<b>TRACK THIS</b>	
<b>Heart</b> resting heart rate // maximum heart rate // ejection fraction	
<b>TRACK THIS</b>	
<b>Lungs</b> lung capacity	
<b>TRACK THIS</b>	
<b>Body and Nutrition</b> body mass index // lean body mass // body fat percentage // basal	

they've gone, and how much farther they need to go. At the end of the run, the user presses stop and the data is saved on the iPod. The next time they sync their iPod, the workout data is automatically uploaded to [NikePlus.com](https://www.nikeplus.com), which adds the current information to the history of all their runs.



### A Study to Determine the Biomechanics of Running in Skilled Trackman

Richard C. Nelson

March 11, 1970

[Download PDF \[4.1 MB\]](#)

The basic science that allowed Nike and Apple to capture this information is low tech, introduced in a 40-year-old study published by biomechanical researcher [Richard Nelson](#) at Penn State. Nelson filmed a mix of 16 freshman and varsity athletes at the university running at various speeds, on smooth and sloped surfaces. What he found was both simple and powerful—the amount of time a runner's foot is in contact with the ground is inversely proportional to how fast he's running and unaffected by slope or stride length. That means if you know how long that contact lasts, you can make a pretty good guess as to how fast the runner is going.

"People in biomechanics knew about this, but they felt it wasn't good enough for the lab, because it's accurate to plus or minus 5 percent," says [Mario Lafortune](#), director of Nike's Sport Research Lab. "But for an application like Nike+ it's tremendously accurate."

The Nike+ sensor consists of just three parts. There's an accelerometer that detects when your foot hits and leaves the ground, calculating that all-important contact time. There's a transmitter that sends the information to a receiver, one that's either clipped onto an iPod nano or built into the second-generation iPod touch. And there's the battery. That's what Nike+ is.

What's more interesting is what Nike+ *isn't*. There's no GPS that automatically tracks your routes—if you want to map your run, you have to do it manually on the Nike site. There's no heart rate monitor, so even though you know how far and how fast you've traveled, you don't know what level of cardiovascular exertion it required. "We really wanted to separate ourselves from that sort of very technical, geeky side of things," Tchao says. "Everyone understands speed and distance."

In other words, Nike+ isn't a perfect tool; it wasn't designed to be. But it's good enough, and more crucially, it's simple. Nike learned a huge lesson from Apple: The iPod wasn't a massive hit because it was the most powerful music player on the market but because it offered the easiest, most streamlined user experience.

But that simple, dual-variable tracking can lead to novel insights, especially once you have so many people feeding in data: The most popular day for running is Sunday, and most Nike+ users tend to work out in the evening. After the holidays, there's a huge increase in the number of goals that runners set; this past January, they set 312 percent more goals than the month before.

There's something even deeper. Nike has discovered that there's a magic number for a Nike+ user: five. If someone uploads only a couple of runs to the site, they might just be trying it out. But once they hit five runs, they're massively more likely to keep running and uploading data. At five runs, they've gotten hooked on what their data tells them about themselves.



In the mid-1920s at Western Electric's [manufacturing plant](#) in Cicero, Illinois, the management began an experiment. The lighting in an area occupied by one set of workers was increased so there was better illumination to help them see the telephone relays they were building. Perhaps not surprisingly, workers who had more light were able to assemble relays faster.

Other changes were then made: Employees were given rest breaks. Their productivity increased. They were allowed to work shorter hours. Again, they were more efficient during those hours.



But then something weird happened. The lighting was cut back to normal ... and productivity still went up. In fact, just about every change the company made had only one effect: increased worker productivity. After months of tinkering, the work conditions were returned to the original state, and workers built more relays than they did in the exact same circumstances at the start of the experiment.

What was happening? Why was it that no matter what the Hawthorne plant managers did, the workers just performed better? Researchers puzzled over the results, and some still doubt the details of the experiment's protocols. But the study gave rise to what's known in sociology as [the Hawthorne effect](#).

The gist of the idea is that people change their behavior—often for the better—when they are being observed (which is why it's sometimes called the observer effect). Those workers at Western Electric didn't build more relays because there was more or less light or because they had more or fewer breaks. The Hawthorne effect posits that they built more relays simply because they knew someone was keeping track of how many relays they built.

When you lace up your running shoes outfitted with the Nike+ sensor and fire up your iPod, you're both the researcher and the subject—a self-contained experimental system. And what you're likely to find is that the Hawthorne effect kicks in. You're actively observing yourself, and just that fact not only provides information you can act on but also may modify your behavior. That's the power of Living by Numbers.

Keeping track of our lives is nothing new. Athletes have kept training logs to quantify and analyze their workouts. Counting calories has long been a popular and effective way to lose weight.

In the past, that required two steps. First, there was the recording of the information, then the actual effort to modify behavior. In study after study, this extra work turned out to be a huge burden. Compliance fell, and the outcome suffered: People would stop monitoring their caloric intake, fail to change it, and fail to lose weight. Make the data-gathering easy and you remove one of the barriers to meaningful improvement in our lives.

With Nike+ and other tools, that first step has become almost effortless. Dieters don't have to calculate the caloric content of meals manually; they can just log in to [FitDay](#) to enter the information in an online food diary. Keeping a training log doesn't mean busting out a pen and paper at the end of a run. It's as simple as listening to music on an iPod while exercising.

But the power of self-tracking is even more profound. It's not just that collecting this data can help us change our behavior all on its own. Using the immensely powerful tools now becoming available, we can set up positive feedback loops: We keep track of something, see how the data matches up with what we'd like to have happen, and then use that knowledge to modify our actions.

The effect of feedback on attempts to change behavior is well established. A 2001 study in the *American Journal of Health Behavior* showed that personalized feedback increased the effectiveness of everything from smoking-cessation programs to interventions for problem drinkers to exercise programs. Feedback is important and powerful; it works.

That feedback can be internal, too, because when we start to do things to make ourselves more healthy, our bodies react. When obese people lose as little as 7 percent of their body weight, the levels of adiponectin in their blood goes up—reducing their risk of developing type 2 diabetes. Or consider the five-run threshold that Nike has seen in the data. It might be that runners not only like the information they get; they might be getting positive feedback from their body after five runs as well.

Think of it this way: It used to be that to lose weight, you'd keep a diary of everything you ate. Stepping on a scale is easy enough and gives one data

<b>TRACK THIS</b>	♀
<b>Women Only</b>	estrogen levels // menstrual cycle
<b>TRACK THIS</b>	♂
<b>Men Only</b>	testosterone levels // sperm count
<b>TRACK THIS</b>	🕒
<b>Living</b>	caloric intake // hours of sleep // exercise duration // exercise intensity // lactate threshold // steps taken in day // mood // medication taken // hours worked // cigarettes smoked

point—about the system's output, not its inputs. But develop a system that allows you to track not only your weight but also what you eat, how you exercise, even how you're feeling, and suddenly you can start to pull things together. You can see how all those variables interact and then put that information to use.

We tend to think of our physical selves as a system that's simply too complex to comprehend. But what we've learned from companies like Google is that if you can collect enough data, there's no need for a grand theory to explain a phenomenon. You can observe it all through the numbers. Everything is data. *You* are your data, and once you understand that data, you can act on it.

**On August 31, 2008**, thousands of runners lined up for a 10K race in Taipei. And in Melbourne, Australia. In Istanbul and Munich, in Paris and New York, in Austin and at Nike headquarters. In 25 cities, Nike organized what it dubbed [the Human Race](#). But if you weren't in one of these locations, you could still participate—by running 10 kilometers on your own and uploading the data to Nike+. That day, 779,275 people participated both at the race sites and virtually, together running more than 4 million miles.

Gathering and connecting such a large community unlocks another powerful effect of Living by Numbers—the feedback loop that comes not from you but from the world around you. Simply put, other people can tell you to go out and run.

It's one thing if some company tells me that I'm slacking off, like when Nike+ sends an email reminding me to get out and exercise. It's a whole different thing if people whose opinion I care about get on my case. Nike+ lets a user create a goal—one that other people can see. Let's say I pledge to run 100 miles this month. I can then enter the email addresses of people I'd like to cheer me on—my wife, my mother, my boss. As I sync up after each run, the data is uploaded to the site, and my support group is updated on my progress. The hope is that they'll use whatever techniques they can to try to motivate me. (One imagines praise, guilt, and threats, in that order.)

Again, Nike is tapping into well-known science here—the power of communities. [Nicholas Christakis](#), a researcher at Harvard Medical School, has been examining how social networks influence our behavior. For instance, in a network of more than 12,000 people in Framingham, Massachusetts, he found that smoking behavior tends to cluster: People quit smoking in groups, as part of a team effort; as more of them stop, the remaining smokers find themselves moving to the margins of the social network. Those community ties have direct effects on people's behavior.

Competition can be another great motivator. Nike+ has a feature that sets up challenges for a group of runners, from just two friends to the entire massive community. Software developer and Nike+ runner Cabel Sasser compares the system to a videogame. "Like any good online game, you can challenge your friends," [wrote Sasser](#) on his blog. "First to 100 miles? Fastest 5-mile time? Your call. These challenges wind up being incredibly inspiring ... Logging in after a long run, uploading your data, and seeing where you are in the standings is a pretty awesome way to wrap up your exercise. And more important, sitting around the house, wondering what to do, thinking about jogging, and then realizing that if you don't go jogging tonight you're going to lose points and slip in the standings—now that's true videogame motivation."

As Nike has slowly added features to Nike+, a small group of outside software makers have raced forward, showing how the system might grow and morph over time. Open source projects like [Neki++](#) and [Running Tracker](#) give you control over your data, allowing you to download and analyze it directly, without going through Nike's site. Since the data is exported from the iPod in a standardized format, it's relatively easy for other services to manipulate. Users have hooked Nike+ into other social networks—[Twiike](#) automatically posts your run data to Twitter whenever you sync it.

In a stance that's uncommon for a company that has historically relied on patented technology like its [Air cushioning system](#), Nike seems to be genuinely excited to see these tools sprout up. After all, the more apps out there, the more Nike+ gear the company can sell. "The more we can open up Nike+, the better," says [Stefan Olander](#), who oversees digital content for the Nike+ site. "The only reason to close it out is because you actually don't believe that you have a strong enough product for others to want to take it and do good things with it." So far, Nike hasn't officially released a software kit to allow developers to hook directly into Nike+, but that's likely to come.

"The open sourcing piece hasn't been developed yet," says Nike CEO Parker, "but that's part of our plan moving forward. The technology here is still in its infancy."

The challenge Nike faces is that it's a hardware company, one that owes its success to deep understanding of cushioning foam and biomechanics. The genius of Nike+ isn't the hardware, no matter how clever and easy to use it might be. The genius is the software—the deeper insight it allows and the connections with others it helps make.

So while some athletes would like to see more features, like heart rate monitoring (the company says that it is looking into it for a next-generation product), that's almost beside the point. If Nike wants to make Nike+ into the universal platform where athletes track their workout data, it has to find new, unexpected ways to collect and share it effortlessly.

Nike has always tried to meet the physical needs of athletes with shoes and equipment, but Nike+ does something very

different. Nike+ is about creating, and then meeting, a psychological need. "What Nike+ taught us about was context," says [Trevor Edwards](#), Nike vice president of global brand management. "It lets the product live beyond its physical use."

**There's a purity** about running. All you need are a set of legs and lungs and the effort required to move forward, faster. For most runners, it's an intensely individual experience—you and the road or trail. The world shrinks, and you focus on yourself in isolation.

Of course, another word for *isolation* is *boredom*. For a lot of people, there's something excruciating about exercise—it's right up there with balancing your checkbook, visiting your in-laws, and flossing your teeth. That was the case with [Rick Law](#). "I used to complain about how inactive I was and wish there was an interesting way to become more physically active," says Law, who works as a technology manager at Thomson Reuters in Fort Worth, Texas. In 2007, Law's wife gave him a Nike+ system for Christmas, hoping it would motivate him.

It did. The first run Law did was just over 10 minutes long, not even a mile. But day after day, he'd head out in the morning before going to the office, putting in the work to get stronger and faster. Soon he was up to 3 miles, then 8, then 10.

By tracking his effort—enhancing an analog experience with digital technology—Law found that running could be as interesting as his work. When you're Living by Numbers, what happens after the run becomes as important as the run itself. Law got feedback as he ran and enjoyed the sense of accomplishment that came from charting his progress as he got more and more fit.

For many Nike+ users, doing their exercise becomes inextricable from measuring it. Again and again, they tell you that without their unit, running is mundane, like listening to a symphony through laptop speakers "Forgetting my Nike+ sensor, or my iPod battery being dead, just takes the life out of my run," Law says.

A couple of weeks before Christmas 2008, Law ran the [Dallas White Rock Half Marathon](#). "It was an endurance struggle for me," Law says. "But in a year, I went from the couch to a half marathon." He finished the 13.1 miles in two hours, 26 minutes, 28 seconds. Now, Law is training for the [Chicago Marathon](#) in October, tracking a new goal. All told, he's spent 75 hours and 27 minutes on the road, and he's put in 428.8 miles. And counting.

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