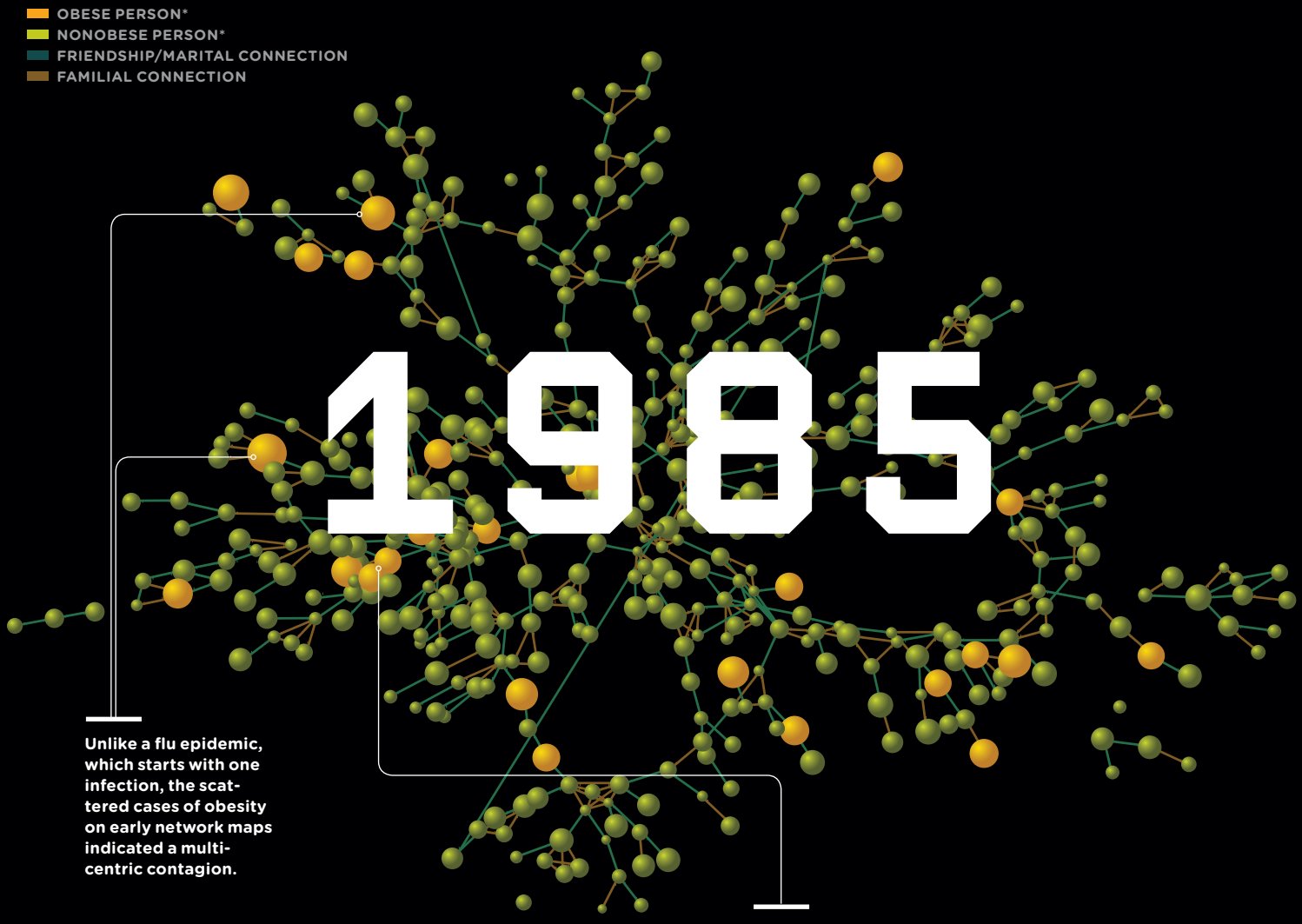
# THE BUDDY SYSTEM

The secret to health and happiness? HEALTHY and HAPPY FRIENDS.

How a half century of medical data revealed the INFECTIOUS POWER of social networks. *by* JONAH LEHRER

## OBESITY: FAT BY ASSOCIATION

In 1948, fewer than 10 percent of Framingham residents were obese. By 1985, 18 percent were, and today about 40 percent are. What changed? Social norms of diet and physical appearance. "A bunch of people discovered fast food at the same time," social scientist Christakis says. "Then the network took over."




*CIRCLE SIZE CORRESPONDS TO BODY MASS INDEX

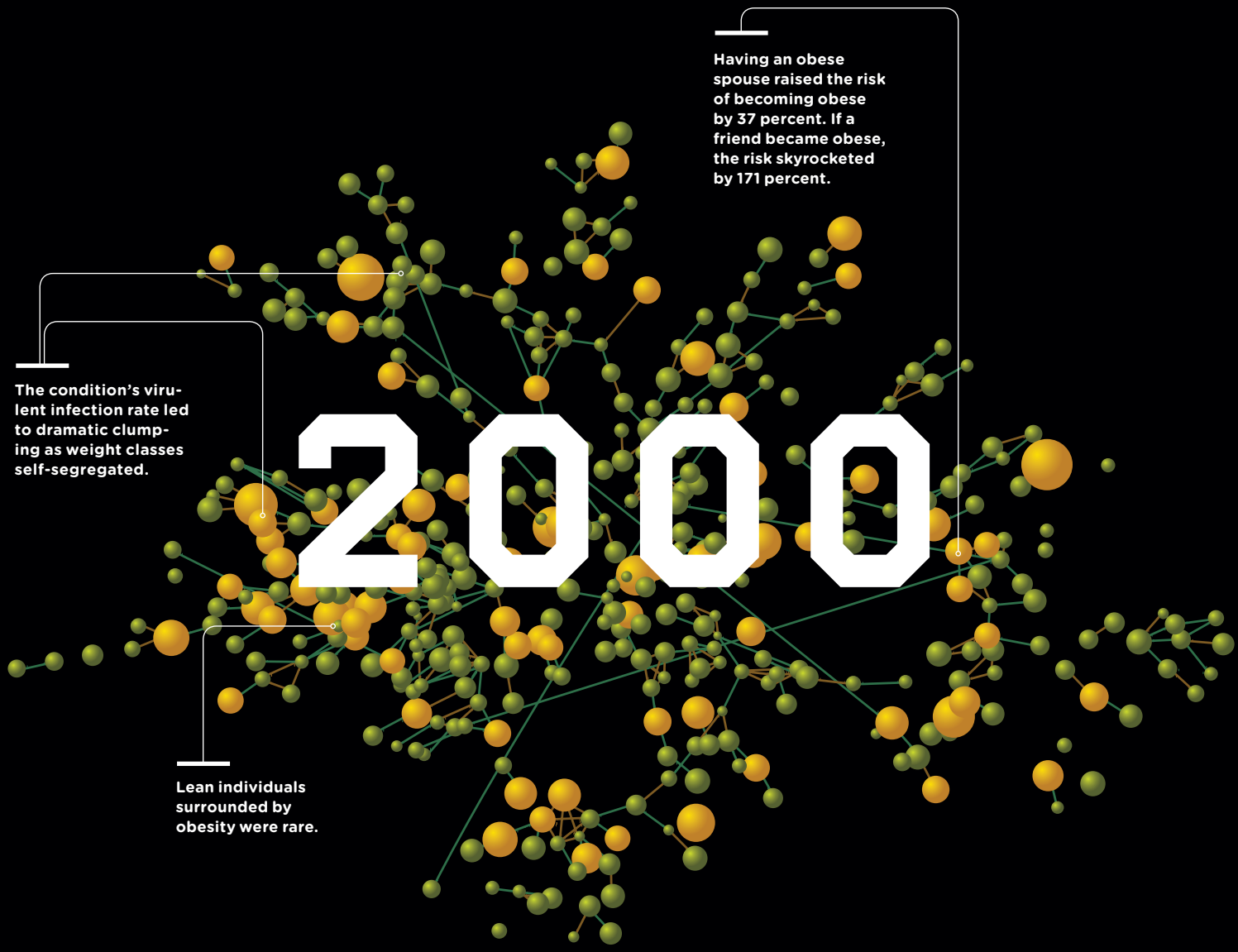
A revolution in the science of social networks began with a stash of old papers found in a storeroom in Framingham, Massachusetts. They were the personal records of 5,124 male and female subjects from the Framingham Heart Study. Started in 1948, the ongoing project has revealed many of the risk factors associated with cardiovascular disease, including smoking and hypertension.

In 2003, Nicholas Christakis, a social scientist and internist at Harvard, and James Fowler, a political scientist at UC San Diego, began searching through the Framingham data. But they didn't care about LDL cholesterol or enlarged left ventricles. Rather, they were drawn to a clerical quirk: The original Framingham researchers noted each participant's close friends, colleagues, and family members.

"They asked for follow-up purposes," Christakis says. "If someone moved away, the researchers would call their friends and try to track them down."

Christakis and Fowler realized that this obsolete list of references could be transformed into a detailed map of human relationships. Because two-thirds of all Framingham adults participated in the first phase of the study, and their children and children's children in subsequent phases, almost the entire social network of the community was chronicled on these handwritten sheets. It took almost five years to extract the data—the handwriting was often illegible—but the scientists eventually constructed a detailed atlas of associations in which every connection was quantified.

The two researchers thought the Framingham social network might demonstrate how relationships directly



influence behavior and thus health and happiness. Since the study had tracked its subjects' weight for decades, Christakis and Fowler first analyzed obesity. Clicking through the years, they watched the condition spread to nearly 40 percent of the population. Fowler shows me an animation of their study—30 years of data reduced to 108 seconds of shifting circles and lines. Each circle represents an individual. Size is proportional to body mass index; yellow indicates obesity. "This woman is about to get big," Fowler says. "And look at this cluster. They all gain weight at about the same time."

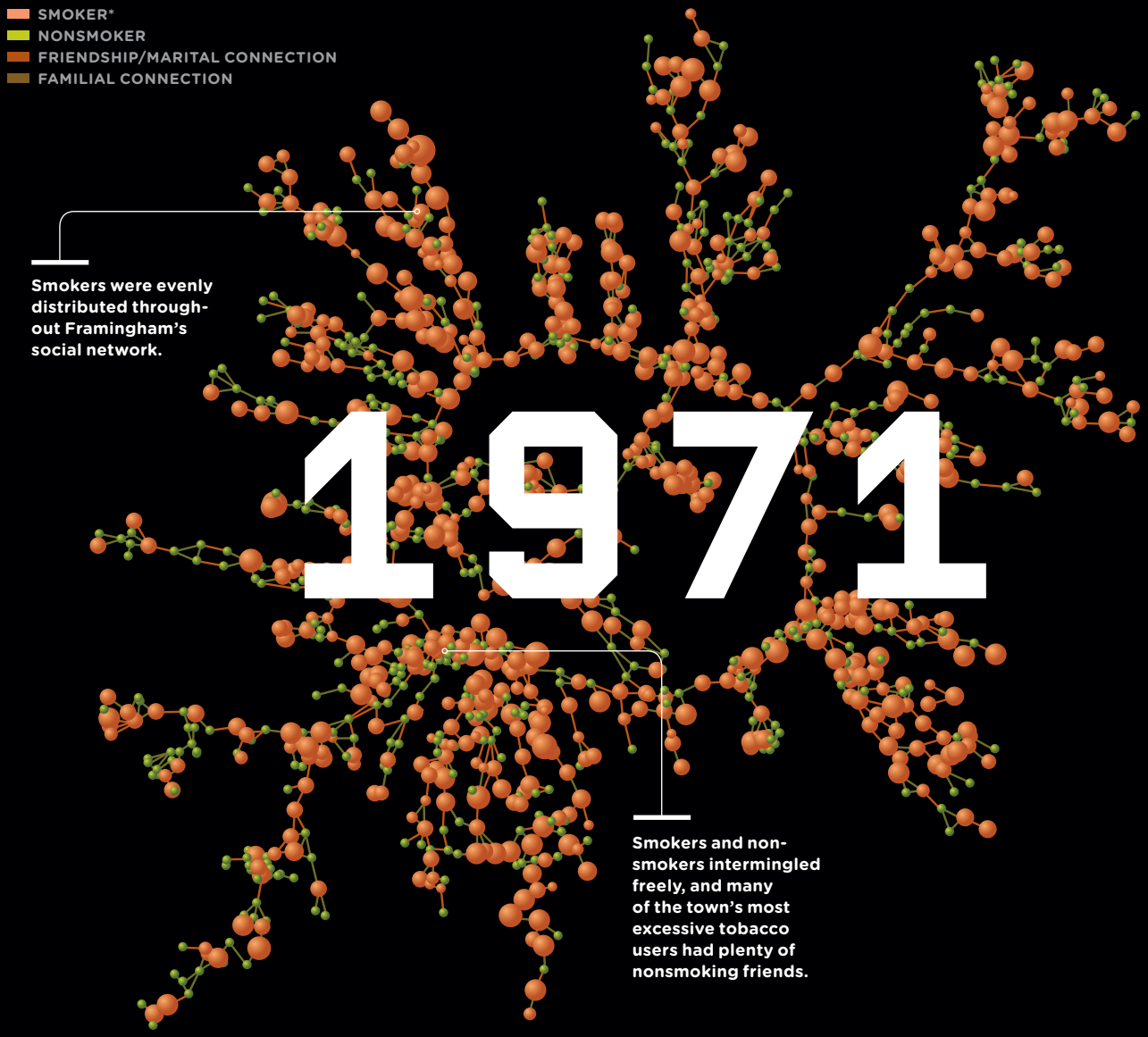
There's something strange about watching life unfold as a social network. It's easy to forget that every link is a human relationship and every circle a waistline. The messy melodrama of life—all the failed diets and fading friendships—becomes a sterile cartoon.

But that's exactly the point. All that drama obscures a profound truth about human society. By studying Framingham as an interconnected network rather than a mass of individuals, Christakis and Fowler made a remarkable discovery: Obesity spread like a virus. Weight gain had a stunning infection rate. If one person became obese, the likelihood that his friend would follow suit increased by 171 percent. (This means that the network is far more predictive of obesity than the presence of genes associated with the condition.) By the time the animation is finished, the screen is full of swollen yellow beads, like blobs of fat on the surface of chicken soup.

The data exposed not only the contagious nature of obesity but the power of social networks to influence individual behavior. This effect extends over great distances—a fact revealed by tracking original subjects who moved away from Framingham. "Your friends who live far away have just as big an impact on your behavior as friends who live next door," Fowler says. "Think about it this way: Even if you see a friend only once a year, that friend will still change your sense of what's appropri-

## SMOKING: TOGETHER WE QUIT, DIVIDED WE FAIL

In the early '70s, 65 percent of Framingham residents ages 40 to 49 smoked regularly. By 2001, only 22 percent consumed one or more cigarettes daily. But the smoke didn't clear at random: Friends and family had a decisive influence. "People quit together," Fowler says, "or they didn't quit at all."




*CIRCLE SIZE CORRESPONDS TO DAILY CIGARETTE INTAKE

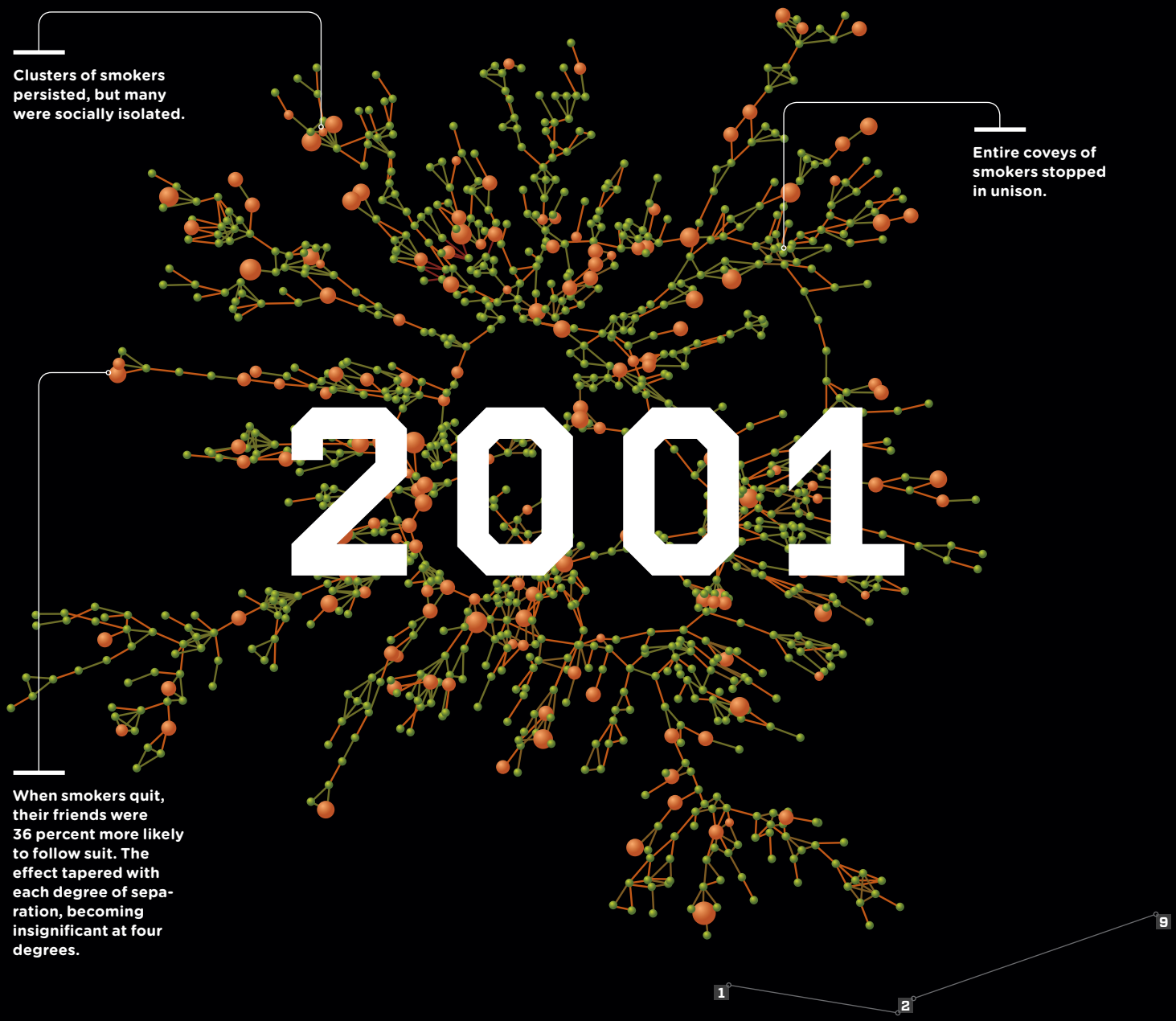
ate. And that new norm will influence what you do." An obese sibling hundreds of miles away can cause us to eat more. The individual is a romantic myth; indeed, no man is an island.

In September, Christakis and Fowler published their first book for a general audience, *Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives*. Although their research is filled with abstruse equations, the two seem most excited when describing the grand sweep of their work. "The story of modern science is the story of studying ever smaller bits of nature, like atoms and neurons," Christakis says. "But people aren't just the sum of their parts. I see this research as an attempt to put human beings back together again."

Once upon a time, social interaction was bounded by space; we met only in person. But then communication became mediated by technology. From telegraph to telephone to email to Twitter, each innovation fed the same anxieties, as people worried that traditional forms of community were being destroyed. The telephone was ruining family life; we're neglecting our real friends for our so-called friends on Facebook.

But does technology actually change the nature of the social network? Or does it simply extend it? It has long been recognized, for instance, that the human capacity for close friendship is remarkably consistent. People from cultures throughout the world report between four and seven bosom buddies. "The properties of our social networks are byproducts of evolution," Christakis says. "The assumption has been that our mind can handle only so many other people."

On Facebook, though, the average user has approximately 110 "friends," which has led some scientists to speculate that the Web is altering the very nature of human networks. For the first time in history, we can keep track of hundreds of people. The com-



puter, they say, is helping to compensate for the limitations of the brain.

But Christakis and Fowler were skeptical of such claims. They knew that social habits are stubborn things. So they persuaded a university to let them analyze the Facebook pages of its students, devising a clever way to distinguish between casual friends and deeper emotional connections. Close friends, they hypothesized, would post pictures of one another on their Facebook pages, since the relationship wasn't purely virtual.

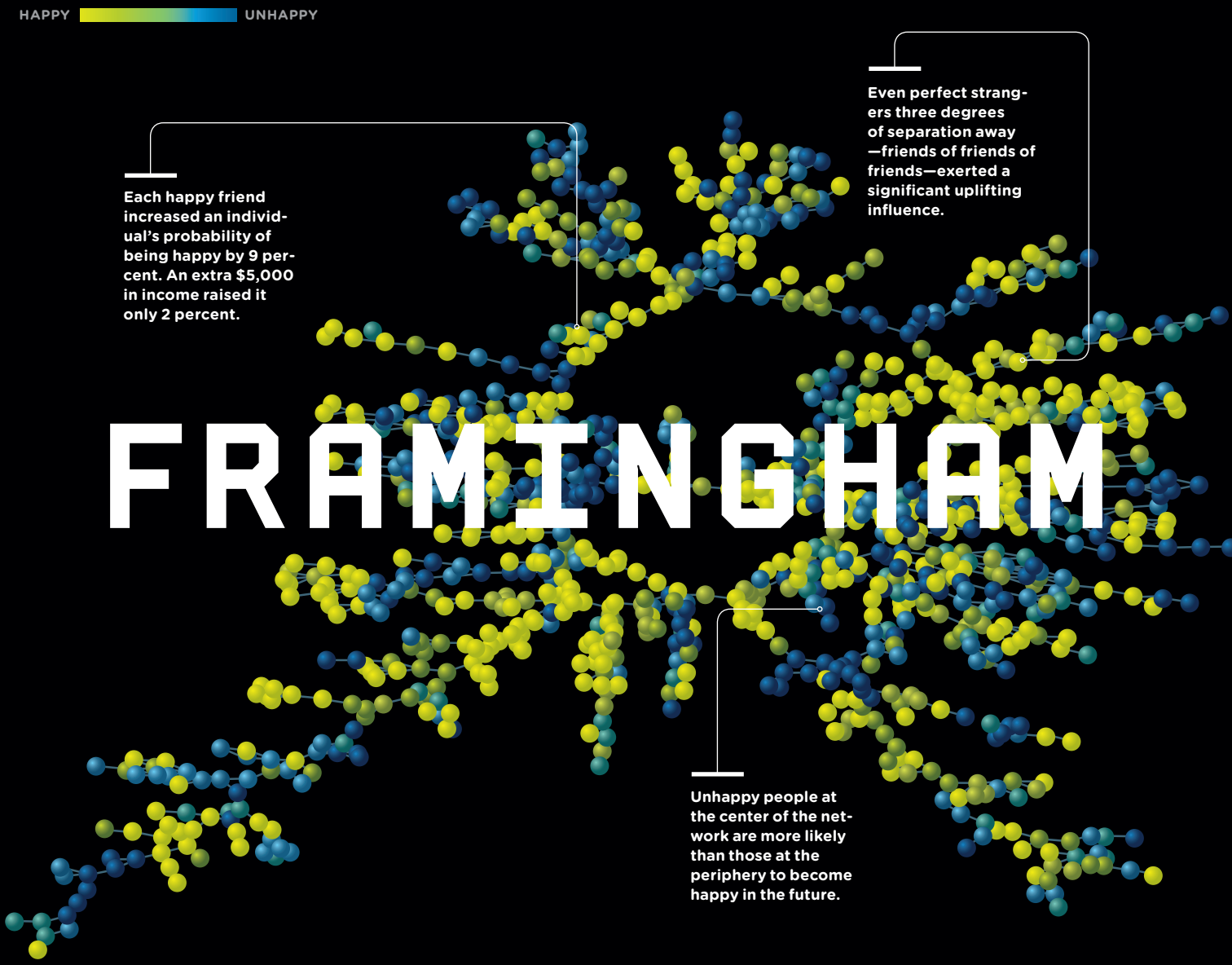
After analyzing thousands of photos, the scientists found that, on average, each student had 6.6 close friends in their online network. In other words, nothing has really changed; even the most fervent Facebook users still maintain only a limited circle of intimates.

"On Facebook, you've got a few close friends and lots of people you barely know," Fowler says. "Because the cost of information transmission is so low"—that is, the site makes it easy to communicate—"we end up staying in touch with more acquaintances. But that doesn't mean we have more friends."

Although the scientists are fascinated by the online world—"Facebook could become a revolutionary data set for people studying networks," Fowler says—their central research tool remains those handwritten papers salvaged from the Framingham Heart Study. In the four years since Christakis and Fowler built their first social map, they've published several groundbreaking papers documenting the network's influence on everything from cigarette addiction to happiness. In some cases, they've found that the impact of networks disappears abruptly after three degrees of separation. (In other words, if a friend of a friend of a friend stops smoking, then we are also signif-

## HAPPINESS: JOY IS CONTAGIOUS, OFFLINE AND ON THE NET

Studying the self-reported moods of Framingham subjects, Christakis and Fowler found that happy people have happy friends (and unhappy people, unhappy friends). Examining smiles in Facebook portraits, they found the same pattern: Even online, social networks gather around joyful expressions.



icantly more likely to quit. But more-distant relationships have no effect; they are beyond the "social frontier.")

Although Christakis and Fowler have begun to study the variables, such as genetics, that determine a person's place within a social network—whether we're in the well-connected center or exiled to the fringe, which reflects popularity—they emphasize that there is no ideal social location. During a flu epidemic, the periphery is the safest place, since people with fewer connections are less exposed to the virus. But being on the fringe also reduces access to gossip and resources, which radiate out from the center. Because networks transmit the stuff of life—from happiness to HIV—evolution has generated a diversity of personality traits, which take advantage of different positions within the group. There are wallflowers and Wilt Chamberlains, shy geeks and "super-connectors." According to Christakis and Fowler, there is no single solution to the problem of other people. Individual variation is a crucial element of every stable community, from the Aborigines of Australia to the avatars of *Second Life*.

And because we're social primates, such communities are essential. When we're cut off from our network, we slip into a spiral of loneliness and despair, which severely affects our health. "Your friends might make you sick and cause you to gain weight," Christakis says, "but they're also a source of tremendous happiness. When it comes to social networks, the positives outweigh the negatives. That's why networks are everywhere." People, in other words, need people: We are the glue holding ourselves together.

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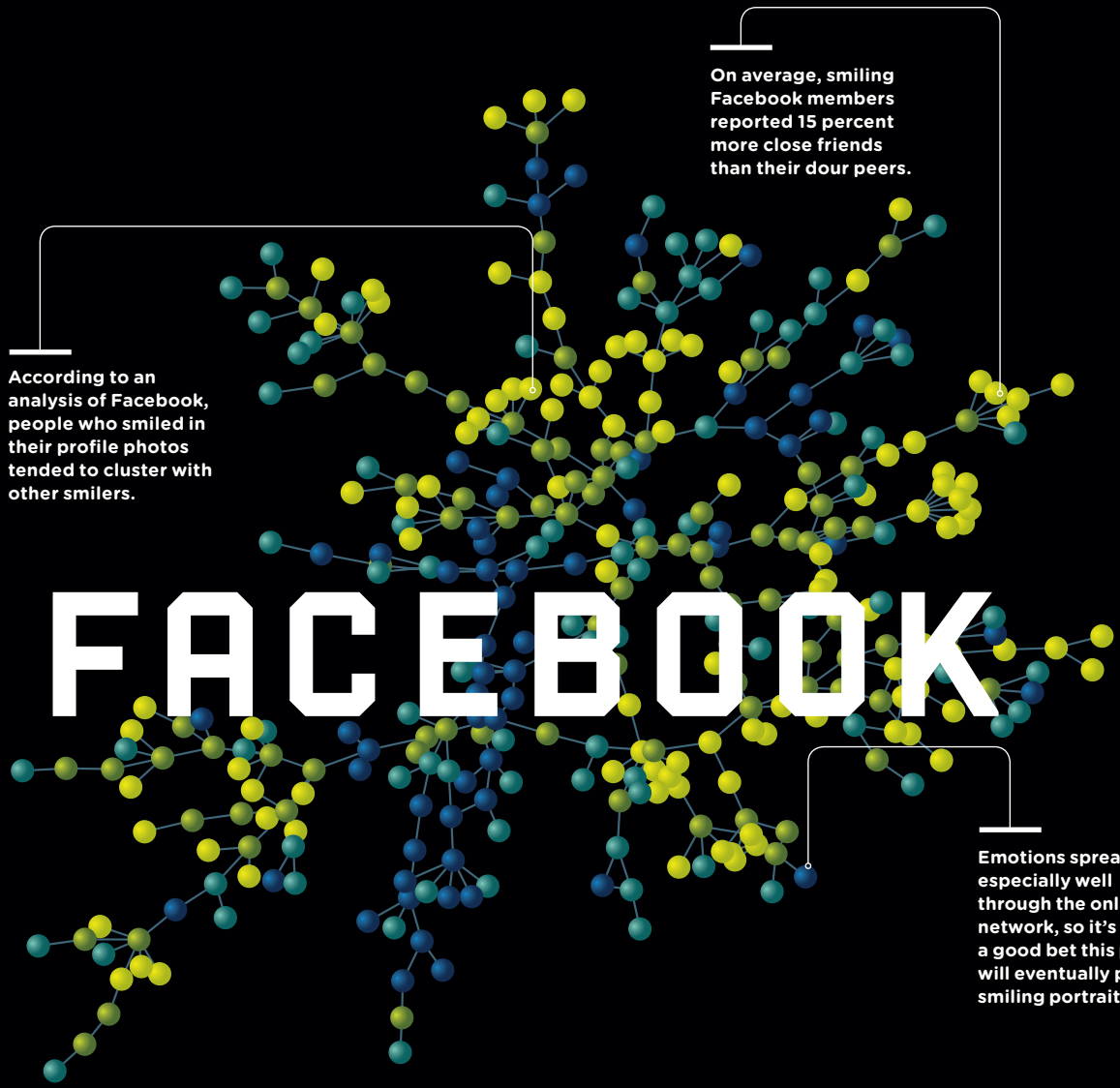


IMAGES BASED ON GRAPHICS CREATED BY JAMES FOWLER AND NICHOLAS CHRISTAKIS