A car races along a twisting, turning road, and your job is to stay the course with just the click of your left thumb. Your right thumb is responsible for shooting down one of those pesky road signs that pops up every few seconds. It’s multitasking, it’s unnerving, and it’s more than just a little bit fun.

The game is the brainchild of Adam Gazzaley, a neuroscientist better known for his academic research on cognitive decline in older adults—namely, how memory impairment occurs as people become increasingly susceptible to distraction. Gazzaley, who holds both a medical degree and a doctorate in neuroscience, is director of the Neuroscience Imaging Center at University of California, San Francisco, and he had long wondered whether this kind of cognitive impairment was reversible. Over the years, he developed tests to find out. But the tests were so boring that he doubted if anyone would ever take them with the kind of attention and focus required to actually change brain patterns.
Then one day it occurred to him: “Oh, that’s what games do. That’s why people play games and why kids don’t even get up to go to the bathroom. Because they’re so involved in them.” That epiphany gave birth to NeuroRacer, a video game—the one with those pesky road signs—that draws on a mix of cognitive skills, including attention focusing, task switching, and working memory (the ability to hold information in mind). Gazzaley was immediately convinced that he had come up with something valuable, but nobody was interested in bankrolling the idea—not until 2009, when the Robert Wood Johnson Foundation invested $287,000 in his project. That modest investment, part of a larger program called Health Games Research, dedicated to exploring the role of gaming in health, allowed Gazzaley to study the effects of NeuroRacer on 46 participants between the ages of 60 and 85. He and his colleagues monitored brain activity, observed eye positions over four weeks of game play, and concluded that the aging game players showed dramatic improvement in multitasking abilities. Their performances were not just better than those of 20-olds who played the game only once; they demonstrated significant improvement in tasks completely separate from the game, tasks that tested them on their sustained attention and working memory, both critical assets for multitasking.

“And that’s the holy grail of our field,” says Gazzaley, whose results were published in the September 5, 2013, issue of the journal Nature. The article reflected the exuberance of its author. “These findings,” it reported, “highlight the robust plasticity of the prefrontal cognitive control system in the ageing brain, and provide the first evidence, to our knowledge, of how a custom-designed video game can be used to assess cognitive
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abilities across the lifespan, evaluate underlying neural mechanisms, and serve as a powerful tool for cognitive enhancement.”

The game proved a big hit for Gazzaley, a striking man who, with his shock of white hair and cultivated stubble, looks more like a Hollywood producer than a university neurologist. He had been fiddling around with the idea for a couple of years, inspired in part by friends who were top designers and programmers at San Francisco-based LucasArts Entertainment Company. “We were like a mutual admiration society,” says Gazzaley. “I’m like, ‘Wow, you build video games.’ And they’re like, ‘Wow, you study the brain and that’s awesome.’ We thought what each other did was impressive and fascinating, and we always thought it would be fun to work together some day.”

That opportunity arose when, grant in hand, he took the prototype of his game to his friends. They then designed the artwork, programmed the software, and threw in a few bells and whistles, all largely for free. “They got a total of $5,000,” he says. “Little stipends. These guys are high-paid professional video-game developers; some of them didn’t even take it. They said, ‘I already have my job, this is my volunteer work.’”

While other health games have floundered because of poor design, NeuroRacer created a buzz. “I would say it’s `fun,’” Gazzaley says, his fingers making air quotes. “But barely. We didn’t have the funding or the time to make it really fun. That wasn’t even the goal. The goal was to make it fun enough for people to do.”
The real fun came later. A good two years before the game made the cover story in *Nature*, it attracted several million dollars in venture capital money and spun off into a commercial company. Today, Boston-based Akili Interactive Labs is run and staffed by Gazzaley’s friends, the onetime LucasArts developers. Gazzaley is Akili’s chief science advisor. And the game that was originally designed for older people has been repurposed—complete with new story, music, and art—into a product for young people with attention deficit hyperactivity disorder (ADHD). That repurposing was at least partly financial: ADHD is “a massive global issue,” Gazzaley says, with a potentially enormous payoff.

Akili has submitted the game, renamed *Project:EVO*, to the U.S. Food and Drug Administration, seeking its approval as a therapy device that doctors can prescribe for young patients with ADHD. The company is also branching out to medical disorders beyond ADHD. If Akili has calculated correctly, video games may become a major therapeutic device for some of the most intractable health problems of the modern age.

**The Potential of Games to Improve Health**

This is a story of a still emerging field, one with enormous potential for the revolution of health care. It is also a story of great optimism and almost equally great frustration. Though most observers believe that gaming has an inevitable future role in health care, its adoption has been slow and its promises as yet unfulfilled.
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Video games today wield more economic clout than movies, and their power is expected to grow exponentially, from $63 billion in global revenues in 2012 to a projected $87 billion in 2017.² In the U.S., the best-selling game of 2010, Call of Duty: Black Ops, generated more sales in its first day than any book, record album, or movie in history, including Star Wars. As the industry changes and matures, so does the profile of its players. According to the Entertainment Software Association, today's game players include more women over 18 than boys under 18. More than 50 percent of households have a dedicated game console, and more than half of American parents view game playing as a positive influence on their children’s lives.³

Back in 2004, when the Robert Wood Johnson Foundation made its first foray into the field, the potential implications for health care appeared enormous but still largely untapped. There were a handful of simulation games for training health professionals, some virtual reality programs for anxiety disorders, a few cognitive health games, some biofeedback programs, and some promising games in the pipeline. One of the latter, Re-Mission, released in 2006 by the nonprofit HopeLab in Redwood City, California, has been highly effective in helping young cancer patients manage their symptoms and comply with chemotherapy and other treatment regimens. This is no small feat for a video game—or even for a structured treatment plan, for that matter.

But finding the next big health game has proved difficult. Health games today reflect but a fraction of the industry share; their research and development budgets barely approach
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$100 million—a mere pittance, considering that developing graphics for a single game for Microsoft’s Xbox can easily cost $10 million. Bringing the power of gaming to health is a stubbornly elusive endeavor. Consider the fate of Expresso Fitness, a Silicon Valley company that builds videos and simulation software to enhance a player’s experience of riding on an Expresso stationary bike. The game was designed to entice people into exercising longer in order to lose weight and gain strength and endurance.

The company attracted $44 million from venture capital firms, but, according to The Wall Street Journal, the financiers exited in 2009 when recession undermined the market plans and gyms decided they didn’t need the equipment after all. “Investing in individual games or sensors is kind of a crap shoot,” says William Rosenzweig, managing partner at Physic Ventures, one of the investors in Expresso Fitness. “It's very fad-oriented. You don’t know which one is going to take off…for games to be enduring in light of the rate of technological change, they have to be threaded into your life. I don’t know how you figure out which game is going to be Monopoly.”

Games for Health: Bringing the Health and Video Game Communities Together

Health gaming got a shot in the arm when the pioneer portfolio of the Robert Wood Johnson Foundation made an exploratory investment in 2004. Then a newly created program team, pioneer was charged with seeking out unconventional, breakthrough approaches to health care problems.
Paul Tarini, a senior program officer at the Foundation who was a leader of the pioneer team, recognized a medium with potential, one that could be customized for different audiences and platforms. “At that time, there wasn’t much intersection between the games space and the health space,” says Tarini. “What existed were games to train professionals to do their jobs, and a big chunk of that was in the military. But no one was thinking how to use games in a therapeutic setting. We saw that when kids played games, they would spend a lot of time with the game, and that they were able to retain a lot of information. It seemed to be very ‘sticky.’ So we wondered how to use games as a supportive therapy to facilitate behavior change.”

Hoping to stimulate interest in video games for health, the pioneer portfolio made an initial grant of $250,000 in 2004 to Digitalmill, a games consulting firm in Portland, Maine. The grant was intended to explore the intersection between two disparate worlds—the world of video games and the world of health and health care—and to accelerate research. Ben Sawyer, who ran Digitalmill, had the ideal background for the job. A game developer and co-founder of the Serious Games Initiative at the Woodrow Wilson International Center for Scholars in Washington, DC, he had spent the previous five years seeking to expand the use of games beyond entertainment.

Before 2004, says Sawyer, people were “mostly doing stuff on their own or getting small bits and pieces of grants.” Now, with his pioneer seed money, Sawyer expanded the Games for Health Project, an organization charged with building the field through
meetings and social networking, and convened the annual Games for Health Conference, where health policy researchers and health care providers could meet with game developers and entrepreneurs. The games community needed to understand that health was a viable segment of the market, one driven by evidence-based research. And the health community needed to appreciate the potential benefits of games to patients and consumers.

Between 2004 and 2013, the Games for Health Conference grew from 120 researchers, health professionals, and game developers to more than 400. The subject matter was just as diverse as the attendees. Presentations ranged from how to use games to deliver health messages to gaming strategy for Post-Traumatic Stress Disorder, stroke rehabilitation, and anxiety reduction.

As Sawyer had envisioned, the conferences generated new collaborations and projects. One of the most noteworthy began when Doris C. Rusch, currently the director of the MIT Game Lab, gave a presentation about a game she was working on to help the families of addicts understand addiction. A Harvard psychiatrist in the audience, T. Atilla Ceranoglu, approached her afterward and asked if her game could be modified for depression. So was born the game Elude. “It’s a great example of what can happen if you just get people in a room together,” says Sawyer. “Our goal all along has been to build some nexus to the space.”
With that in mind, he published white papers and gave presentations that defined the concept of games for health, listed notable health-related games, and laid out ideas for the field’s future. Sawyer also posed provocative questions: Was it reasonable to think that video games could change health care? Would providers use them? Would insurance companies get behind them? Could gaming prove an effective way to change behavior and not just attitude? Did the words *health* and *video games* even belong in the same sentence?

**Health Games Research: Building a Body of Knowledge**

By 2007, satisfied that this was a field deserving attention, the Foundation authorized $8.25 million for the University of California, Santa Barbara (UCSB) to establish a national program called *Health Games Research: Advancing Effectiveness of Interactive Games for Health*. The program was designed to build a body of knowledge; to determine whether health games could in fact change health care; and to advance innovation, design, and effectiveness. Of the total grant, $4 million was set aside for disbursal to 21 research projects around the country. The research was to concentrate on games, such as Adam Gazzaley’s *NeuroRacer*, that help prevent or manage chronic illnesses, rather than on games that, say, train clinicians. The remaining funds paid for staffing, technical assistance to the 21 projects, communications, a website, and a database of health-related video games. Digitalmill received about $750,000 to continue its annual conference and research.
The **Health Games Research** program was directed by Debra Lieberman, a widely recognized media researcher at UCSB’s Institute for Social, Behavioral, and Economic Research and a lecturer in the university’s Department of Communications. Lieberman has devoted much of her career to the study of digital media and games as a tool for learning and behavior change. Fresh out of college in 1973, she received a fellowship to Harvard University’s Graduate School of Education, where she helped Sesame Street researchers and producers in the development of new TV programs for children. In the early 1990s, as vice president of research at a Silicon Valley health software company, she helped develop Super Nintendo video games to motivate health behavior change in patients with Type 1 diabetes and asthma.

Early results of Super Nintendo games showed promise. A randomized, controlled study reported that the diabetes game was especially effective for children between eight and 16. Before playing the game, the kids in the study averaged two-and-a-half diabetes-related urgent care and emergency visits per year. “Six months later they had dropped down to an average of one-half visits per child, per year,” Lieberman says. “That’s a 77 percent drop and at least a $2,000 reduction in medical costs per child, per year. We thought we had a business, anticipating that health plans would buy our games and give them to their members to improve health and reduce costs…. But we discovered that in the 1990s the medical world was not yet ready for this.”
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Health Games Research awarded its grants on the basis of a game’s meeting at least one of two prerequisites: It had to require physical activity, or it had to enhance a player’s health-related knowledge, skills, attitudes, and social support. Under the Foundation’s guidelines, no grant could exceed $300,000, a decision that was controversial but closely reasoned; the projects were chosen to focus on studying health games, not developing them. Also, no more than 25 percent of a grantee’s budget could be spent on game development.

“The bottom line is that we needed more well-designed and robust research studies in our field, and it was important not to cut corners in research support,” Lieberman says. “For the health care community, the biggest hurdle to embracing games has been a dearth of peer-reviewed data that provide a standard of proof that health games really do work.”

In addition to Gazzaley’s project, grantees included:

- Researchers at Georgetown University in Washington, D.C., who measured weight loss among obese and overweight African-American adolescents after playing Nintendo’s Wii Active exergame. The seven-month experiment examined physiological, social, and cognitive outcomes, and compared youths who played competitively with those who played cooperatively. The results, while mixed, suggested considerable value in sharing difficult goals with a teammate, as the youths who played cooperatively lost weight; those who played competitively did not.4

- Students and professors at Teachers College, Columbia University in New York, who developed and evaluated a smoking reduction game called Lit2Quit. A player
breathes into the microphone of a cell phone, which then uses sound, color, images, rewards, and feedback responses to control breathing and mimic the stimulant and relaxant effects of smoking. The idea is to get smokers who are trying to quit to reach for this five-minute game instead of a cigarette. The results have not yet been published.

• Researchers at Indiana University, Bloomington, who studied an alternate reality game designed to promote physical activity and healthy lifestyles among college freshmen. *BloomingLife: The Skeleton Chase* involves an interactive story that unfolds over the course of eight weeks, using a variety of media (email, websites, phone calls from fictional characters, physiological monitoring) and real-world physical and mental challenges. Preliminary results show that collaborative and social gaming, positively influence physical activity.

• Researchers at the University of Vermont, Burlington, who studied whether a biofeedback video game could improve cystic fibrosis patients’ use of inhaled medicines and breathing exercises and awareness of their respiratory status. The research team developed the breath biofeedback game in collaboration with patients. Results indicated that the game helps give adolescent patients the autonomy they crave, using recreational activities to support treatment demands.

**Face Station: A Game for Autistic Children**

*FaceStation*, funded under the *Health Games Research* program, is a suite of arcade-style games designed to improve face perception skills in eight- to 17-year-olds with an autism spectrum disorder. Developed and tested at the Center for Autism Research at The
Children’s Hospital of Philadelphia, this series of games appeared a perfect fit for its target audience, since many young people whose conditions fall on the autism spectrum share an all-consuming interest in technology and computer games.

The goal of Face Station was to help them read facial expressions and distinguish one face from another; players would do so by linking rewards to the close observation of faces, something autistic kids would typically rather avoid. In fact, however, the idea proved more difficult to carry out than the researchers had anticipated. The preparation itself was a massive job, entailing the collection and editing of some 1,000 photos of more than a hundred actors, every image taken at a different angle and employing a different facial expression, be it angry, happy, sad, or surprised. Game development and pilot testing proved so expensive that the grant’s budget was entirely depleted before tests for clinical efficacy could even begin. The game designers and the scientists negotiated at length over the acceptable levels of violence and “fun”—as opposed to “training”—that could be included. Though they eventually reached an agreement, the results were mixed. Face Station fell short of the level of sophistication that young people have come to expect from video games, and while the treatment schedule required near-daily game play, the youths’ parents frequently had to cajole them into playing.

Despite such challenges, the feedback proved tantalizing enough that Robert Schultz, the Center for Autism Research’s director, decided to take the project to the next step. Drawing on his own internal funding, he launched a new study. A group of youths with
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autism would be given a nasal spray of oxytocin minutes before playing the game. The autism community has pinned much hope on oxytocin, a naturally occurring hormone that is released in the body during childbirth, lactation, and socialization. Research labs around the country are currently testing it on autistic children and teens, with early results showing increased social interaction and improved social communication skills. Scientists at the Center for Autism Research are similarly excited about the hormone’s potential, but they believe it needs to be combined with a structured treatment plan—such as a video game.

Which is why, one morning in late summer 2013, a 14-year-old boy from New Jersey happened to be driving with his mother to Philadelphia. Jay is a handsome boy whose life revolves around video games. Once he arrived at the clinic, he stared out the window, unengaged, as he answered a graduate student’s endless research questions. Then Jay asked a question of his own: “What’s the nasal spray for?”

“Good question,” replied the graduate student. “It’s to see if it helps kids play games better.” That was accurate enough. If oxytocin is as promising as hoped, game players will recognize faces much faster than they would just by playing the game without the oxytocin.
“I never thought I’d need medication to make me play better,” said Jay, his eyes still trained toward the window. He has a dry wit and clearly enjoys making people laugh, despite the fact that he rarely makes eye contact.

After his mother sprayed puffs of the hormone in his nasal passages, Jay was soon clicking away—matching smiling faces, perturbed faces, and frowning faces in a series of games with names like Dr. Face’s Potion Shop and The Adventures of Pennsylvania Jones. Jay clicked and clicked as computerized pings signified reward.

“He spends hours and hours on computer games,” said his mother, watching. “It’s really out of control. He doesn’t want to go outdoors, he doesn’t want to go anywhere or do anything. All he wants is to play video games. He’s not an outdoor child.” “Maybe if you took the TV outside,” Jay said drollly, his eyes never leaving the screen.

Gaming itself holds no special interest for the autism center’s Robert Schultz. “I’m not fascinated with games, I’m fascinated with treatment,” he says. That is why Schultz intends to stay involved with games. Recently contacted by Akili Interactive Labs, the company launched by Adam Gazzaley’s game, Schultz found their offer an enticing one. “It’s an extremely powerful looking group,” he says. “The people they have backing them are very esteemed. Plus, they want to develop something for autism, which is where I want to make my impact.”
A Burgeoning, Struggling Field

By setting its considerable footprint in the gaming world, the Robert Wood Johnson Foundation has given it a measure of validity. Suddenly, the phrase “health games” no longer sounds like an oxymoron. “You can call it anecdotal,” says Digitalmill’s Ben Sawyer, “but I’ve heard it a million times. People from health insurers, government agencies, large bureaucracies—when I’ve called, I get my calls returned. They tell me, ‘Half the reason I can talk to you is that the Robert Wood Johnson Foundation is signaling this is worth taking a look at.’

In 2006, the Centers for Disease Control and Prevention (CDC) sponsored a conference that included sessions on health games, after which it encouraged some of its employees to develop game ideas. One employee, Dan Baden, a physician and the Associate Director for External Partner Outreach and Connectivity in the CDC’s Office for State, Tribal, Local and Territorial Support, took the bait and began exploring the use of games to advance public health.

In 2011, he attended Ben Sawyer’s Games for Health Conference. “If I hadn’t gone to that conference, I wouldn’t have received all the invitations to speak that I do today,” says Baden, who now spends a dedicated portion of his time developing health games for the CDC. “I’ve been able to educate others on the amount of activity going on in this field. If I say that the Robert Wood Johnson Foundation is in this field, it carries weight.”
Baden is part of a loose network of aspiring game developers within the CDC. Most of
their products are training games, intended for internal use, but some are available
externally. One, *Solve the Outbreak*, gives players the chance to explore disease outbreaks
and learn what it is like to be an epidemiologist. Another teaches coal miners how to
safely evacuate mines during emergencies.

Baden is particularly proud of a game he designed that helps primary care physicians
understand the impact of public health on clinical practice. Developed to support the
U.S. Department of Health and Human Service’s “Million Hearts” initiative, a national
plan to prevent a million heart attacks and strokes by 2017, it is a basic time-management
game. As the clock ticks, the number of patients in the waiting room builds, putting
pressure on the player who has 15 to 20 seconds to address each patient’s heart disease
risk factors. “The kicker,” says Baden, “is that after you complete a level, you can spend
points to implement health policies—like smoke-free air—and this will decrease the
percentage of future patients who smoke. The point is to show clinicians that public
health policy has the ability to improve the health of their patients and make them easier
to treat, which in turn makes physicians’ lives easier.”

The National Institute on Drug Abuse also got involved, funding a few video games as
tools for treating substance abuse. One, a virtual reality game, tosses virtual cigarette
packs into virtual trashcans. Another, a prevention education game called *Media Detective*,
teaches elementary-aged children to spot hidden elements in ads that may encourage drug
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and alcohol use. A series of games, Reconstructors, teaches adolescents about the biological and social impact of drug abuse. Middle school students learn how classes of drugs affect the body, especially the nervous system, and are encouraged to develop negative attitudes towards drug use.

“Provided the games are appropriately targeted,” says Jessica C. Chambers, Program Official/Health Science Administrator at the National Institute on Drug Abuse, “video games have the potential to have a positive impact on behavior change among substance abusers, particularly youth substance abusers. Whereas many youths report a dislike of, and discomfort with, the one-on-one format of traditional behavioral substance abuse treatment, they seem to be very attracted to technology. And it is pervasive in their culture.”

Despite these bursts of investment and experimentation, the burgeoning field continues to struggle. Consider Humana’s investment in gaming. In 2008, the nation’s fourth largest health insurance company rolled out Horsepower Challenge, an exergame that it pilot-tested among a group of 100 sixth-graders at five public schools in Louisville, Kentucky. The children were given a wireless pedometer and encouraged to walk. All their steps were recorded and uploaded to power a networked video game. The more steps they took, the more power they had to play the game.
The game proved a huge success. After a four-week trial, Humana reported a 13 percent increase across all five schools in the number of steps, with 53 percent of the kids reporting that they had begun to exercise at home with their families. Humana announced plans to take the game to 20 additional cities, which it did in 2009 and 2010. And then, one day, the game was gone. So was the company’s gaming division and Innovation Center. The experiment was over.

Today, Humana partners with the video game company Ubisoft. “It is fair to say that we have shifted some of the focus of our community health and well-being initiatives to ‘live play,’” says Kate Marx, a company spokeswoman. “These include pedal buses that we deployed at our national conventions during 2012; our WalkIt Challenge with the PGA Tour; and the playgrounds we are building across the country with KaBOOM!”

From the beginning, Kaiser Permanente has taken a more cautious approach. “When we look at childhood obesity, our message to parents is that kids need less screen time, not more,” says David Sobel, medical director of patient education and health promotion at The Permanente Medical Group. “Yet, newer approaches to applying gaming to changing behavior can be both more physically and mentally engaging—especially when compared to traditional forms of health education, such as reading materials and classes.”

Sounding a little envious, Sobel says that what he finds exciting about the people who design games “is that they are as much behavior folks as they are tech people. When health information is well designed and engaging, the focus is on the content and
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engagement strategies first, and then the technology of how to deliver it. Sometimes the missing ingredient is how to mix them together to be engaging and fun. Games are designed to manipulate and influence people. The health game designers understand a lot about what drives human behavior.”

It is not surprising, then, that Kaiser Permanente has begun testing the gaming waters. In 2008, it established the Innovation Fund for Technology, a program charged with exploring and developing new technologies. As of 2013, it had funded three health games, one of which, Dr. Hero, was the idea of Sonia Soo Hoo, a Kaiser Permanente obstetrician/gynecologist who was inspired, in part, by her game-playing daughters. Soo Hoo’s game, intended for training OB/GYN care teams and residents, and developed with help from a professional gaming company, is now being widely used throughout the organization’s Northern California region.

Video Games for Health—An Oxymoron?
The mere mention of “health video games” tends to raise eyebrows. In the public’s mind, sitting in front of a video screen is often associated with negative health outcomes, from obesity to antisocial behavior.

In 2009, President Obama gave a speech before the American Medical Association in which he said parents should take responsibility for their children’s health by “raising our children to step away from video games and spend more time playing outside.” In 2011,
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the American Academy of Pediatrics issued a policy statement—its first in 12 years on the subject—discouraging television and other screen time for children under two. In doing so, it cited the lack of evidence supporting developmental benefits and pointed to potential adverse health and developmental effects on young children.

But now a growing discussion among researchers, educators, neuroscientists, doctors, and policy analysts is questioning that perspective. Neurologists are quick to note that while every activity, be it reading a book or playing the trombone, changes the brain, video games are somehow “different.” Their effectiveness lies in the way they activate the brain’s reward system, strengthening the synaptic connections of neural circuits in much the same way that pumping iron builds muscles. “Yes, some video games are sedentary,” says Health Games Research program director Debra Lieberman. “But we do a lot of sedentary things, such as reading or going to the movies, and no one says that these pastimes are sedentary and, therefore, bad. Reading, movies, and game playing should be done in moderation and everyone should get plenty of physical activity, social interaction, work time, and so on. Don’t blame video games...there are plenty of times during the day when you are not going to be jumping around anyway.”

Moreover, says Lieberman, citing games for malaria prevention, alcohol relapse, and stroke rehabilitation, “games can improve prevention behaviors, healthy lifestyle behaviors, self-care, adherence, disease self-management, clinical training, and delivery of care.”
The arguments pro and con reflect not only the research but also personal experience. Jessie Gruman, the founder and president of the Center for Advancing Health in Washington, DC, has argued that game designers are so far removed from the reality of sickness that they don’t understand something basic: it can’t be made “fun.” A three-time cancer survivor since her diagnosis of Hodgkin’s lymphoma at age 20, Gruman, now 60, took on the health gaming industry in February 2013 in an open letter directed at mobile health app developers. Published on her organization’s website, the letter detailed how, when she traded in her old phone for a new one, she realized she wasn’t interested in loading “even a single one of the 23 health-related apps that I had carefully chosen and used from the old phone to the new.” She wrote that her experience with these apps had left her feeling “ornery and impatient.” Her letter went viral.

“Being a sick person is tedious, difficult, and boring,” says Gruman, “and most people would rather spend less time thinking about it instead of playing a game about it. Like right now, I try to keep a food diary. But it takes me more time to write down what I eat than it does to eat it. I don’t want to play a game. I already spend far too much time accommodating to my illness, resting from it, talking to people about it, transferring my records. Anything that adds to the burden of me doing it is just not going to work. Maybe a kid would one time play a game, but I just can’t see it.”

But to hear Carolyn Thomas tell it, video games aren’t just for kids. Thomas, 63, is a heart attack survivor who has become a big fan of the Nintendo Wii, using it to work out
her frustrations, engage with family members, and get a punishing workout that leaves her gasping for breath and drenched with sweat. Like Gruman, Thomas has become a forceful patient advocate—in her case, both in her hometown of Victoria, British Columbia, and online, where her blog (www.myheartsisters.org) has drawn more than a million followers worldwide since launching in 2009. She began developing her base after suffering a major heart attack, originally misdiagnosed as acid reflux, at age 58. A longtime distance runner, Thomas had never imagined herself as a cardiac patient: “I bought the stereotype that heart attacks happen to men. I thought a heart attack is when you clutch your chest and fall down unconscious. That’s a sudden cardiac arrest; that’s not a heart attack. Women can walk and talk and pick up the kids and cook dinner while they’re having a heart attack.”

After her recovery, Thomas found herself indignant over the lack of knowledge about women’s cardiac health and the fact that women younger than 55 are seven times more likely to be misdiagnosed than men in a cardiac emergency. Determined to change that statistic, in 2008 she attended the WomenHeart Science & Leadership Symposium, a one-week education “boot camp” at the Mayo Clinic in Rochester, Minnesota.

Upon her return home, she lectured to small groups and launched a series of “Pinot & Prevention” parties intended to educate women on their risk of heart attacks. On her blog, she has touted the pleasures of boxing and ski jumping on the Wii with her grown daughter: “You stand on a little pad that senses your weight and balance. Then you have
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to crouch down and leap up. It doesn’t sound like much, but holy moly, the next day my daughter and I were paralyzed…I go to regular physical fitness classes at the gym, but I never feel like I am dripping with sweat like I am at the end of an evening with my family. That’s the beauty of the Wii. You’re having fun. It tricks you into exercising.”

The Future: Promise and Frustration

Health games have come a long way. The field now has a bona fide community for networking and collaboration. “When we look at where the field was in, say, 2007, and where it is today,” says the Robert Wood Johnson Foundation’s Paul Tarini, “our sense is that the notion that games can be used in health and health care is no longer novel but accepted.”

Even so, health games have yet to be embraced by the major players in the commercial video game field. The problem appears to be lack of a viable business model: Who will buy the games? Will insurance companies reimburse for their use? So far, these questions have no answers, but certainly no one expects that the business model for health games will mirror that of consumer games. It’s highly unlikely that parents will line up to buy the latest version of Face Station or even NeuroRacer, if it were available commercially, for a Christmas stocking. Video games are by their very nature consumable and disposable. Kids develop mastery, beat the game, and go on to the next one. This quality determines the business model.
The expectation for health games is, however, much higher than for commercial games. “A lot of health games are for kids with autism, kids with cancer,” says Christopher Wasden, Managing Director—Global Healthcare Innovation Leader at PricewaterhouseCoopers. “They’re for very scary emotional challenges, and they try to teach kids through a game what to expect and how to improve their health. That more noble objective makes it more difficult than for other games to be successful. But how do you make it both noble and sustainable as a business? Given this dual requirement, to what extent should we have expectations that the health games segment can become very large?”

Wasden was recently engaged in an experiment designed to answer just these kinds of questions. An instructor at the University of Utah, he advised students in the Games4Health Challenge, a collaboration of the university’s gaming/engineering program, business school, and health sciences center to develop prototypes of health-related video games and smartphone applications. The ubiquity of smartphones and other mobile devices has altered the conversation on games, says Wasden. Up to now, most of the research on the efficacy of health games and apps has been conducted before the launch of smartphones.

“The reality,” he says, “is that until smartphones came out, there weren’t health games and apps that were engaging and effective. Most of the data was done on laptop and
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desktop computers, which make for clunky, cumbersome interfaces. The thing that makes games more engaging is putting them on a mobile platform.”

For his part, Ben Sawyer, the founder of Games for Health, admits to being more than a little disappointed in the lack of progress. “We’ve watched entrepreneurs come and go and come again,” he says. “We’ve watched foundations invest, retreat, and invest again. It’s easy to create different pieces of games that have great opportunity, but the transfer of that to the health field is very difficult.”

It’s not that Sawyer has soured on the future of health games. It’s just that he now sees that the transition will be much slower than he once expected. Yes, he says, a few games by independent developers are starting to make a dent—he cites one game designed to help people learn how to grieve, and another that tackles the subject of hormone replacement therapy. “But if you had asked me nine years ago if I would have seen more uptake by now, I would have said yes.”

In addition to the nonexistent business model, Sawyer points to another challenge: health games remain largely within the province of academia. They haven’t begun to attract the interest of large game developers like Nintendo, Sony, and Electronic Arts. And without the big developers’ skills in designing games that are fun, eye-popping, and engaging, their future potential is limited.
“The important thing is, you can’t let policy wonks, academics and doctors design the game,” says James Gee, a professor of literacy studies at Arizona State University, and one of the most respected researchers in the field. While the content of a game may reside in academia, says Gee, the fun of the game—what makes it a game and not a straight-out lesson—lies with the game maker. “We’re at the beginning of game developers making these games, and the academics have to step aside.”

A longtime proponent of bringing the learning model of video games into the classroom, Gee sits on the advisory board of iCivics, a web-based education project founded by retired U.S. Supreme Court Justice Sandra Day O’Connor. He also sat on the national advisory committee to the pioneer portfolio as it wrestled with the programs it would fund. “I have the highest admiration for good games,” says Gee. “Making a good game is an art form. There’s no algorithm for it. People thought in the beginning that it would be really easy. But a good game has to have an interesting problem. And then it has to give a person an interesting way to solve it. Health is full of problems that don’t have easy solutions.”

By the end of the Health Games Research program in September 2013, it was clear that the Robert Wood Johnson Foundation’s investment had helped bring credibility to a field where there had once been little. “Health games could have easily been a passing fancy that captured our imagination for a short while and then disappeared from memory or practice,” says Bill Ferguson, the Commissioning Editor at Mary Ann Liebert, Inc., the
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academic publishing house that identified the niche for a dedicated journal, the Games for Health Journal. “The Robert Wood Johnson Foundation fostered the idea until it became mature enough to stand on its own feet.”

But standing on its feet remains a problem. Now in its third year of publication, the Games for Health Journal has not been easy to sustain, according to Tom Baranowski, its current editor in chief. There has been a dearth of submissions, and grants for game research are still occasionally rejected by reviewers at the federal level with belittling comments to the effect that “Games are the source of the problem of obesity. They should be completely restricted.”

The Foundation’s Paul Tarini remains hopeful, however. “If the question is whether there’s a game that helps someone manage their diabetes, and that game is being used by 5,000 diabetics—no, we haven’t seen that level of use,” he says. “But I think we’re seeing more use and more acceptance of gaming in health and health care.” Tarini points with pride to the pioneer team’s early support of Digitalmill’s Ben Sawyer, who helped launch the conversation. And he sees promise in the results of the Foundation’s work with Adam Gazzaley and NeuroRacer. Commenting on the results of the NeuroRacer research having been published in Nature, he add, “I think our timing was very good,” Tarini says. “It’s always nice to see research get published in a high quality journal. We take that as indication not only of the quality of the research, but that the research is relevant. If that research had been done 10 years earlier, it may not have made it into Nature.”

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Notes:


4 Adolescent exergame play for weight loss and psychosocial improvement, Obesity, Vo. 21, 3, April, 2013

5 http://www.cfah.org/blog/2013/an-open-letter-to-mobile-health-app-developers-and-their-funders#UpQW92SidRY