

SIDEBAR

✦ Virtual  
Lessons, Real  
Productivity

## Seeing Is Believing

Maybe virtual reality isn't just a game anymore. Maybe it's a way to build a better you.

BY KARA PLATONI  
ILLUSTRATION BY MONDOLITHIC STUDIOS

**THERE'S NOT MUCH** in this room except a worn-looking blue-gray carpet, a stack of computer equipment and a \$25,000 helmet that assistant professor of communication Jeremy Bailenson is attaching to my head. Not a particularly imposing place to be studying the future of human interaction.

With the helmet on and my world gone dark, Bailenson leads me to a spot in the empty middle of the room, then taps some computer keys. Zunk!

I am standing in the very same room that I was before—same blue-gray carpet, same blank walls—only this version of the room exists inside Bailenson's computer, and is being fed to my eyeballs via a screen inside the helmet. In the real room, the blue carpet stretched reassuringly from one wall to the other. In the virtual room, it's interrupted by a gaping pit with a board across it. "Your job is to walk across the pit," says Bailenson's disembodied voice.

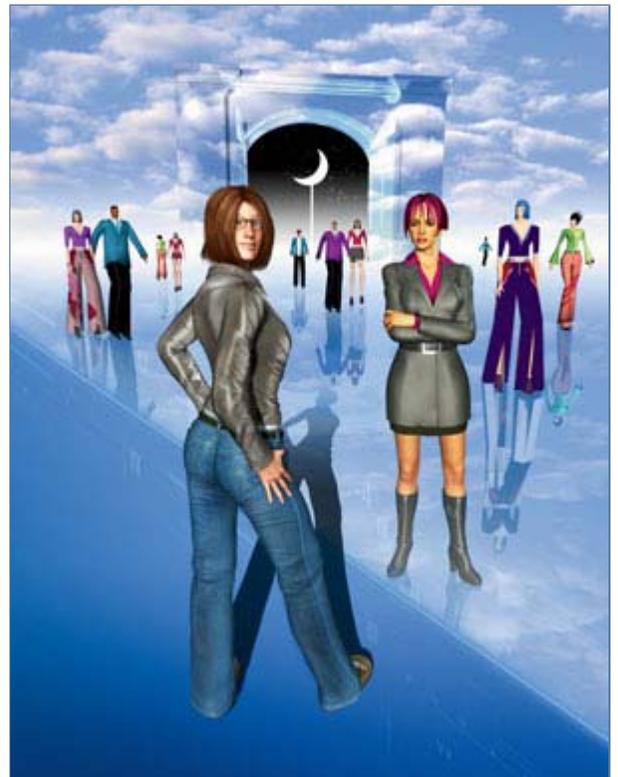
The pit yawns ominously. I take a few tentative steps onto the board, and the virtual world seamlessly re-draws itself around me, thanks to cameras mounted in the corners of the real-world room. They track my movement by following the blue LED that waves from my helmet like the dangly antenna of a deep-sea fish.

"Pause for a second," Bailenson says. "Look at the way that you're walking, very carefully with your arms out for balance. Remember what is on the floor right now?"

Right, just carpet. No hole. I sheepishly stop wobbling.

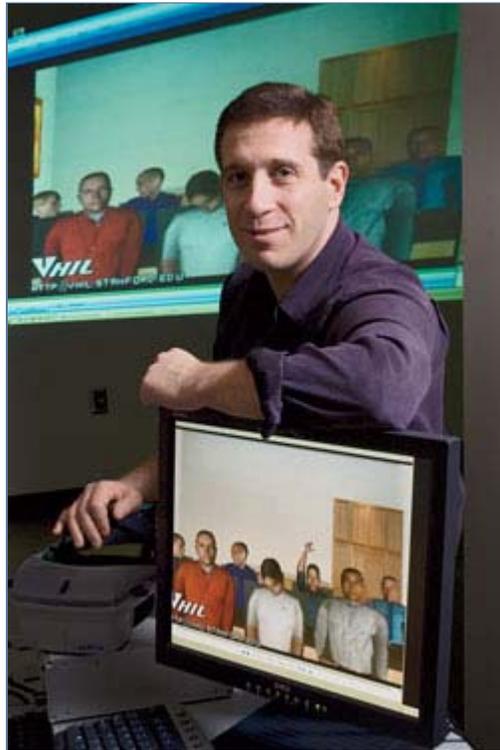
"I've had some of the worst reactions in this world that you can imagine," says Bailenson sympathetically. "People falling down, sprinting, screaming."

I'm not here to be a screamer, so I grit my teeth and throw myself into the pit. It's like falling down a hole in a Road Runner cartoon: brick after identical brick zooms



by, as I plunge, feet-first, making a yelping noise that is not, technically, a scream.

I land at the bottom with a jarring thud. It is delightful and horrifying at the same time—a small demonstration of how vulnerable we all are to digital illusion. My body reacts as if the hole is real, even though my brain knows it's Memorex.



**VIRTUAL IS ITS OWN REWARD:** Studies in Bailenson's lab are showing that experience gained via digital alter egos can change how people behave in real life—at least in the short term.

You don't have to visit Bailenson's Virtual Human Interaction Lab, or wear a helmet, to play in disembodied space. In our increasingly digital society, video games, chat rooms and social networking sites let us make friends, solicit dates or attend classes, all in the guise of a digital self. Ordinary folks spend prodigious amounts of time as avatars, or digital alter egos, in online role-playing games like World of Warcraft or Second Life.

Bailenson's lab group studies the social mechanics of this virtual existence, in which identity is malleable and things are not always what they seem. The rules are different online, affecting everything from how we treat one another to how we comprehend ourselves, and blurring where our real identity overlaps with the virtual one. "In the past, VR [virtual reality] has always been this amazing toy that someone has in their garage, and in the last five years what we started to see is that this stuff is no longer science fiction," Bailenson says. "How is this changing who we are as humans? How is that affecting the human identity?"

**Fred Mertz** This form of pretending is so powerful that what happens online doesn't necessarily

stay online, Bailenson argues. Experiments in his lab have shown that what you experience as your digital doppelgänger lingers after you power down the PC—and bleeds into your real-life identity, at least for a while. His Stanford research team has begun exploring how those virtual experiences might be used to tweak who you are, for better or worse.

**OVER THE PAST FIVE YEARS,** Bailenson's lab has been amazingly prolific at exploring how people transform themselves digitally. The lab currently has five graduate students who run studies, assisted by 25 undergrads. While their interests have radiated in several different directions—looking at identity transformations in contexts like gaming, negotiating and advertising—their central hub is the idea that people can interact differently in virtual worlds than they would face-to-face.

After all, the digital self can have "superpowers" the real you does not. For example, in the real world, making eye contact increases your persuasiveness, but you can gaze at only one person at a time. In cyberspace, Bailenson's lab has found, you can make your avatar seem to gaze at multiple people; they'll pay more attention than they would in a face-to-face conversation, and be twice as likely to agree with you. In real life, mimicking people's behavior can persuade them; in cyberspace, where every movement is digitally tracked, you can be a more accurate and subtle copycat. Merely copying someone's head movements after a four-second delay makes them much more likely to agree with you, Bailenson found.

You can transform your appearance online in ways that would be impossible in real life. Wish you were

People who were

16 again? Choose a teenage avatar. Change your race? No problem. Want to be supermodel-tall? Fine. "It doesn't matter what you look like when you get out of bed, because you always look optimal when you present yourself via entities on the Internet," Bailenson says.

Sure, dress-up, role-playing and mimicry are nothing new: who hasn't upgraded their look to impress a date, or echoed the boss's jargon during a job interview? But virtual reality takes pretend to a whole new level—it doesn't just fool the viewer, it fools you. Seeing your altered self in the third person can actually change the way you behave in real life.

Nick Yee, who received his PhD in communication in 2007 and has returned to the lab as a staff researcher, dubbed this the Proteus Effect, after the Greek god who could shift form. Yee describes an experiment in which people who were given taller avatars behaved more aggressively in a virtual bargaining task than people with shorter avatars. When the subjects later repeated the task with a real person, "people who had been in taller avatars continued to bargain more aggressively face-to-face." Similarly, following a virtual reality exercise, subjects were asked to choose people they'd like to approach from a mock dating website: people who had been in more attractive avatars during the exercise chose more attractive partners.

This change in self-perception happens remarkably quickly. "It only takes 90 seconds of exposure to a mirror image transformed in age, height or gender to cause drastic changes in behavior," Bailenson says. Why are we so easily tricked by the way we look? Possibly because, unlike donning a costume or putting on makeup in real life, in cyberspace your avatar is your whole self-representation, the primary identity cue that tells you how to behave socially.

Here's the kicker: none of the subjects in these experiments could guess how he or she was being manipulated. People are wired to believe what they see, even in virtual reality, where everything one senses can be manipulated.

Bailenson is doing "super-important" work because "he's not just studying what happens while you're in there, but what happens afterwards," says his colleague, communication professor Cliff Nass. "There have been studies before using something as simple as costumes—you have people dress up in a KKK costume and you see how prejudiced they behave. But Jeremy said, 'I wonder if this changes things after you're done?' and no one thought to ask that! People thought, these changes are so small and minimal . . . but what Jeremy understood was that because you are living in the skin of that new character, it really does change your definition of self, and that's shocking."

Indeed, through his study of avatars, Bailenson is exploring what Nass dubs "ancient Greek stuff"—the very essence of self-understanding. "When I am in digital space, there is some point where it's clearly me, and some point where it's clearly not me," Bailenson says. "How far can I push and transform before it's a completely different person? It really raises the questions about what it means to have an identity and what it means to be."

How can these digital alter egos transform our real-world selves? This is where I come in. Wearing a helmet.

**I AM BACK** in the room with the blue-gray carpet.

given taller avatars behaved more aggressively in a virtual bargaining task than people with shorter avatars. People with more attractive avatars hit on hotter partners at a mock dating service.

Hal Ersner-Hershfield, a fifth-year PhD candidate in psychology, has just given me a survey, asking if I'd prefer small sums of



**SCREEN MAKEOVER: Fox studies whether people who watch a digital self run on a treadmill are then more active in real life.**

Courtesy Virtual Human Interaction Lab

money today, or slightly larger sums in the future. (For example: \$6 today, or \$9.60 in six days?)

That done, he has taped two blue LEDs to my shoulders, cranked the helmet to my head, and switched me over to the room-within-a-room. It's much like before, except the pit is gone, and there's a mirror on the wall reflecting something hideous: me.

Technically, it's me at age 62—this avatar was created by digitally aging a photograph of 32-year-old me. My nose has bulged. My cheeks have sunk. My eyes are ringed with red. Hair is hard to render, so part of mine is simply missing. Why did I not take more vitamins?

Ersner-Hershfield puts me through exercises designed to help me bond with my aged avatar: I move and she copies me; I answer personal questions while gazing into her bloodshot eyes.

A few minutes later, out of the helmet and back in the real world, I take another today-or-tomorrow money survey, and decide how I would divide a \$1,000 windfall. Would I buy gifts, plan a party, save for retirement or fund my checking account?

"Perspective taking," or imagining oneself as another, has long been a psychology-experiment staple, but virtual reality can make this almost literal—you actually can see yourself as someone else. In this case, Ersner-Hershfield asks, "If we put you into the virtual reality environment and then you see an aged version of your face, will that cause you to think more about yourself in the future, to place more importance on the future?" In other words, will I prioritize cash tomorrow over cash today?

This is a pilot study, so the results aren't in. (I preferred future rewards both before and after the test, but seeing Future Me made Present Me worry about retirement for weeks afterward.) Ersner-Hershfield imagines that if bonding with your futurized image encourages saving, retirement planners or banks might be able to use a less-intrusive application—say, by virtually aging a photo that clients upload to a website—to spur Americans' moribund saving habits.

Similarly, Jesse Fox, a second-year communication PhD candidate, is examining the lingering effects of seeing your digital self exercise. She's shown that subjects who watch their own avatar run on a treadmill are more active the next day than subjects who see a stranger's avatar run, or who see themselves stand still.

One day in the lab, Fox hands me a pair of two-pound weights, then cranks the helmet on. My avatar stands before me. This time, she's my age, but she's built like a linebacker. Fox keeps count as I do bicep curls, and although my avatar doesn't move, the more I exercise, the slimmer she becomes. The pounds melt first off her thighs, then her belly and shoulders, and finally even her hands shrink. Fox tells me to take a breather; once I stop moving, my avatar swells.

It's too early in this study to draw conclusions, but Fox wonders if seeing how exercise affects their avatars might help people stick to health plans in the real world, where the benefits of exercise aren't

**If you bond with an aged version of your**

immediately visible, and where people often aspire to the unhealthy skinniness of celebrities and models. "If you could see a virtual representation that's more akin to yourself," Fox says, "I think that could certainly enhance people's adherence, and cultivate realistic goals and expectations that will actually be met."

Of course, these trials could have the opposite effect—people repulsed by their aged avatars could decide to live for today, or people who watch themselves exercise might just feel tired. There are no guarantees that role-playing won't have contrary effects. The experience of viewing oneself with the appearance of another has generally been embraced as a means to broaden perspectives and reduce prejudice toward other groups, but some skeptics argue that this experience could reinforce preconceptions and biases.

face, wonders Ersner-Hershfield, shown below as himself, his present-day avatar and his potential old guy, will you 'place more importance on your future?'



Courtesy Virtual Human Interaction Lab

Third-year communication PhD candidate Victoria Groom is working on a study in which subjects of different races view themselves in a virtual mirror. As their "reflection," some see avatars of their own race; others see themselves as someone of another

race. Afterward, the subjects take a word-association test that measures their implicit racism. Groom wonders if, because there are "so few cues of identity in these online worlds," the reflection about race a person sees will take on even more importance.

Yee, who studied online role-playing games, says that digital life has a tendency to replicate social norms, even undesirable ones. "People infer a lot of their expected behaviors from how they look, and when you put someone in a virtual world their avatar is their entire identity." In fact, Yee says, entire virtual worlds can end up stereotyping themselves. "One thing that really frustrates me is that in a world where you can be anything and anyone you like, why does Second Life look so much like suburban America?" Houses look like tract homes, instead of, say, floating orbs. People run around in Abercrombie & Fitch knockoffs. Women are exaggeratedly curvy. "There's almost an overemphasis on looking stereotypically good." If online play affects real-life identities, what does it mean when such a popular virtual reality application reinforces class and gender tropes, rather than obliterating them? "There is also a cautionary note from the Proteus Effect," Yee says. "Maybe the avatars we use in the virtual environment have unintended consequences we're not aware of."

**JEREMY BAIENSON'S VIRTUAL REALITY CAREER** was itself somewhat unintended. He isn't particularly computer nerdy. He doesn't even play video games. "I live in California." He shrugs. "It's nice out."

His interest in virtual spaces is less about the hardware, and more about the networks: what happens to your mind when you are living digitally. His work is partly inspired by novelists like William Gibson and Neal Stephenson, whose cyberpunk fantasies he read while studying cognitive psychology at the University of Michigan and Northwestern University.

His first opportunity to combine the two came from UC-Santa Barbara, which had a grant from the National Science Foundation to use virtual reality in psychology experiments. Bailenson accepted a postdoctoral fellowship there in 1999, in the process switching from cognitive psychology, with its emphasis on logic and reasoning, to social psychology, which is more concerned with identity and interaction.

At the time, virtual reality was seen mostly as a tool

Entire virtual worlds

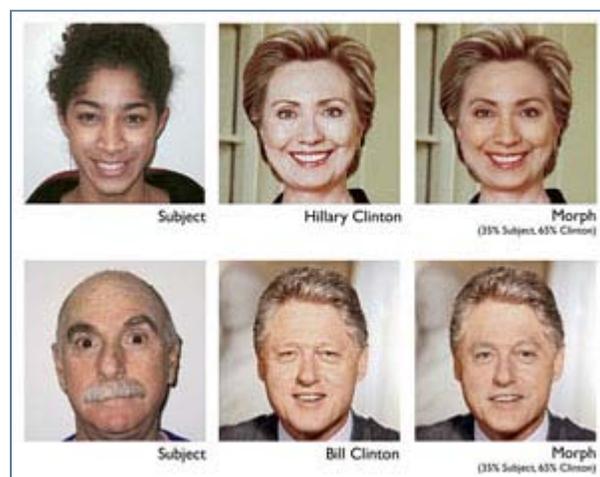
for separating or remixing social concepts: for example, you could dissociate sex from gender by having a man assume a female avatar, and study how he behaved. To show that cyberspace studies produced legitimate results, researchers were mostly replicating studies already done in the real world. Bailenson itched to try something new. "The cool thing about being in virtual space is not showing how similar everything is, but is really focusing on the things that you can uniquely do in digital space." One of those things is "the ability to transform oneself, in lots of fascinating and strange and dangerous ways."

can end up stereotyping themselves. 'In a world where you can be anything and anyone you like,' Yee says, 'why does Second Life look so much like suburban America?'

Although Bailenson pulled down a couple of grants to explore these digital identity transformations, it was harder to find a teaching job. "Year after year I was going on the market and getting rejected from schools you've never heard of," he recalls. "It turned out that I wasn't really doing psychology any more. . . . I was studying the process of communicating using digital media." When Stanford's communication department, which has a tradition of studying human-computer interactions thanks to the work of Cliff Nass and Byron Reeves, offered him a spot in 2003, Bailenson once again changed disciplines. "It turns out this field of communications, which I knew nothing about before I applied for this job, is about as wonderful a fit as I could hope for."

Although Bailenson's entry into virtual reality research was circuitous, it's been well-received. Tech visionary Jaron Lanier, who coined the phrase "virtual reality" and founded the first firm to sell VR equipment, recalls the limits of 1980s understanding. "We had the gloves and bodysuits—we couldn't help but try these things anecdotally, but that's not science, that's storytelling." Now he brainstorms with Bailenson about new ideas to test and is excited that the behavioral constructs of virtual life can be rigorously examined. "Jeremy's practical experiments—doing something concrete to see what a human is capable of—are more interesting."

**ONE LAST EXPERIMENT.** I'm back in the virtual room, and once again Jesse Fox is at the controls. This time the avatar before me is a sexy lady with red hair and a slinky cocktail dress. Fox tells me to approach her. There's something unusual about her, but before I can figure it out, Fox gives me a task: I'm supposed to walk through red cubes that begin appearing in mid-air. I am so absorbed in finding cubes that I forget about the woman. Once we're done and I take the helmet off, Fox lets me watch her monitor as Bailenson tries the test. That's when I realize what's different about this avatar: she looks right at you. When you approach, she gently moves away. When the red cubes appear, she looks at them, too.



**ELECTABLE LIKE ME:** The power of digital imaging raises the specter of manipulation. When photos of undecided voters were partially morphed into those

Fox explains that she's meant to be highly interactive, to react to her environment the way a real person does. Fox wants to see if people treat her differently—for example, if they stand closer to her than they would an avatar who is basically scenery, and whether that changes when she's scantily clad, as so many female game avatars seem to be. (To test this variable, half the subjects will instead see the lady wearing a dumpy track suit.) Afterward, they'll take a word-association test designed to measure sex stereotyping. "Maybe we find that as long as the avatars are interactive they are going to treat the woman like a real person,

**of candidates, the voters would prefer a candidate with whom they'd been melded, but could not detect that the photo contained their own face.**

Courtesy Virtual Human Interaction Lab

it doesn't matter how she's dressed—that would be a positive finding," Fox says. "But it could be that more highly interactive and more sexualized is more potent, so

that could have an even greater negative ramification—that maybe makes them objectify someone even more." It's a great question to ask: if the virtual world exaggerates stereotypes, as Yee showed in his studies of online gaming, will that change the way we treat characters in it?

Here's another tough question, raised by second-year communication PhD candidate Sun-Joo (Grace) Ahn: because people tend to take what they see online at face value, can their behavior be shaped by deliberately false information? Ahn's developing a test in which subjects' faces are Photoshopped directly into ads, or partially morphed with the faces of other endorsers. She wants to know if seeing themselves endorsing a product—something they haven't actually done on- or offline—will make subjects prefer it. (This is a move directly from the science-fiction playbook, admits Bailenson: think of the movie *Minority Report*, based on a Philip K. Dick short story, in which retina-scanning billboards adjust their ads for passersby.) Similarly, a Bailenson experiment done before the 2004 election in collaboration with Shanto Iyengar, director of Stanford's Political Communication Lab, partially morphed the photos of undecided voters with those of either George Bush or John Kerry. Voters preferred the candidate they'd been morphed into—but could not consciously detect that the photo contained their own face.

The implications of this kind of work are mind-boggling and a little creepy: is this online game of let's pretend ultimately empowering, because we can be anything we want, or potentially sinister, because we can be so easily manipulated by unseen hands? Bailenson's not picking a side—he's really more interested in asking questions than in drawing broad policy conclusions—but he often points out that pretending has always been a part of human nature. "On the one hand, transforming a virtual appearance is no different than wearing makeup or styling one's hair," Bailenson muses. "On the other hand, a world in which someone can instantly grow 20 centimeters, swap genders and stare into the eyes of a dozen people at once is completely new territory."

Studying virtual reality as a widely used medium, rather than as a high-tech toy, is still in its infancy. The field is rife with wild ideas and uncomfortable questions, and that's what makes it exciting to explore. "The goal of my work is to understand the consequences and opportunities of a world in which people are using digital media more and more. How does that really affect who we are on a social level?" Bailenson asks. It's the sort of thing you can only find out if you put on the helmet and jump into the pit.

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