

Virtually feeling fat

February 1 2011, By Charles Q. Choi



An avatar with large belly size representing the participant. Credit: Jean-Marie Normand, Elias Giannopoulos, Bernhard Spanlang & Mel Slater

Greasy food and a lack of exercise aren't the only things that can make you feel fat -- now you can add virtual reality and being poked by a stick to the list.

By having people wear head-mounted displays that make them see pot-bellied computer-generated versions of their bodies and by having them poke their tummies with sticks at the same time, scientists found they could make people experience the [illusion](#) of having a fat paunch.

Such research is more than just an elaborate parlor trick -- it could help people who feel uncomfortable in their own bodies.

Virtual reality is typically thought of as a way to manipulate where people feel they are. However, computer scientist Mel Slater at ICREA-University of Barcelona and University College London also finds it's a way to tinker with how people view their own bodies. For instance, he and his colleagues previously discovered that they can make a virtual arm feel as if it were attached to a person's body and even make men feel as if their bodies were female.

All these illusions depend on jabbing a person's real arm or body while at the same time simulating these pokes on that participant's virtual reality counterpart. They do not even require virtual reality -- research over the past decade has shown that a person can feel as if a rubber hand is part of his or her own body, if a real hand of his or hers that researchers have hidden from view is patted at the same time that they see the fake one get tapped. This "rubber hand illusion" can even apply to objects that bear no resemblance to body parts. When scientists put adhesive bandages on both tables and people's real hands, stroke both simultaneously and then partially rip the bandages off only the tables, many people winced and some even reported feeling pain.

To further explore self-perception, Slater and his colleagues developed a one-person rig where 22 volunteers could tap their own bellies with a stick. At the same time, participants wore virtual reality goggles displaying virtual rods poking much larger simulated bellies. In experiments, the subjects heard music with a complex, irregular rhythm through headphones for four minutes and were told to pat their bellies in time with the beat.

When the taps that volunteers felt were synchronized with the pokes they saw their virtual bodies receive, on average they reported that their bodies felt bigger than normal.

"Although I did expect the results, I still find it surprising how liberal the

brain is in allowing apparent changes to the body," Slater said.

The most important implication of these results "is that it might be possible to apply perceptual illusions in the cognitive therapy of body image related disorders," said cognitive neuroscientist Valeria Petkova at the Karolinska Institute in Stockholm, who did not take part in this study.

For instance, if scientists can generate the illusion that a thin person is fat, they should be able to create the illusion that a fat person is thin. People who are unhappy with being overweight could experience how eating healthily can alter an individual's virtual appearance, which could serve as a strong motivator to change future behavior in reality, Slater said.

Slater said that besides therapeutic applications, such [body transformations](#) could also serve as entertainment.

The findings [were published](#) in the journal *PLoS ONE* in January.

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