The (Really Scary) Invisible Gorilla

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The Invisible Gorilla is part of the popular culture nowadays, thanks largely to a widely-read 2010 book of that title. In that book, authors and cognitive psychologists Dan Simons and Christopher Chabris popularized a phenomenon of human perception—known in the jargon as "inattentional blindness"—which they had demonstrated in a study some years before. In the best known version of the experiment, volunteers were told to keep track of how many times some basketball players tossed a basketball. While they did this, someone in a gorilla suit walked across the basketball court, in plain view, yet many of the volunteers failed even to notice the beast.

What the invisible gorilla study shows is that, if we are paying very close attention to one thing, we often fail to notice other things in our field of vision—even very obvious things. We all love these quirks of human perception. It's entertaining to know that our senses can play tricks on us. And that's no doubt the extent of most people's familiarity with this psychological phenomenon. But what if this perceptual quirk has serious implications—even life-threatening implications?

A new study raises that disturbing possibility. Three psychological scientists at Brigham and Women's Hospital in Boston—Trafton Drew, Melissa Vo and Jeremy Wolfe—wondered if expert observers are also subject to this perceptual blindness. The subjects in the classic study were "naïve"—untrained in any particular domain of expertise and performing a task nobody does in real life. But what about highly trained professionals who make their living doing specialized kinds of observations? The scientists set out to explore this, and in an area of great importance to many people—cancer diagnosis.

Radiologists are physicians with special advanced training in reading various pictures of the body—not just the one-shot X-rays of the past but complex MRI, CT and PET scans as well. In looking for signs of lung cancer, for example, radiologists examine hundreds of ultra-thin CT images of a single patient's lungs, looking for tiny white nodules that warn of cancer. It's these expert observers that the Brigham and Women's scientists chose to study.

They recruited 24 experienced and credentialed radiologists—and a comparable group of naïve volunteers. They tracked their eye movements as they examined five patients' CT scans, each made up of hundreds of images of lung tissue. Each case had about ten nodules hiding somewhere in the scans, and the radiologists were instructed to click on these nodules with a mouse. On the final case, the scientists inserted a tiny image of a gorilla (an homage to the original work) into the lung. They wanted to see if the radiologists, focused on the telltale nodules, would be blind to the easily detectable and highly anomalous gorilla.

The gorilla was miniscule, but huge compared to the nodules. It was about the size of a box of matches—or 48 times the size of a typical nodule. It faded in and out—becoming more, then less opaque—over a sequence of five images. There was no mistaking the gorilla: If someone pointed it out on the lung scan and asked, What is that? – everyone would answer: That's a gorilla.

After they were done scrolling through the images as much as they wanted, the scientists asked them: Did that last trial seem any different? Did you notice anything unusual on the final trial? And finally: Did you see a gorilla on the final trial? Twenty of the 24 radiologists failed to see the gorilla, despite scrolling past it more than four times on average. And this was not because it was difficult to see: When shown the image again after the experiment, all of them saw the gorilla. What's more, the eye-tracking data showed clearly that most of those who did not see the gorilla did in fact look right at it.

To their credit, the trained radiologists did detect the anomaly more often than the naïve volunteers. Indeed, none of the untrained volunteers reported seeing the gorilla, so it does seem that experts are somewhat less prone to this form of blindness. It's probably because their full attentional capacity is not consumed by the primary task, which they are accustomed to. Reassuringly, the experts were also much better at spotting the warning signs of lung cancer.

This is not meant as an indictment of radiologists, the scientists emphasize in an article to appear in the journal *Psychological Science*. This particular kind of visual search is notoriously difficult. But there is no way around the main finding, which is that 83 percent of these highly trained physicians missed what might have been a life-threatening anomaly. For anyone relying on radiological diagnosis of a serious disease, it's small comfort that the experts outperformed the average man on the street.

Wray Herbert's blogs—"We're Only Human" and "Full Frontal Psychology"—appear regularly in *The Huffington Post.*