How our brain tricks us into missing stunt doubles

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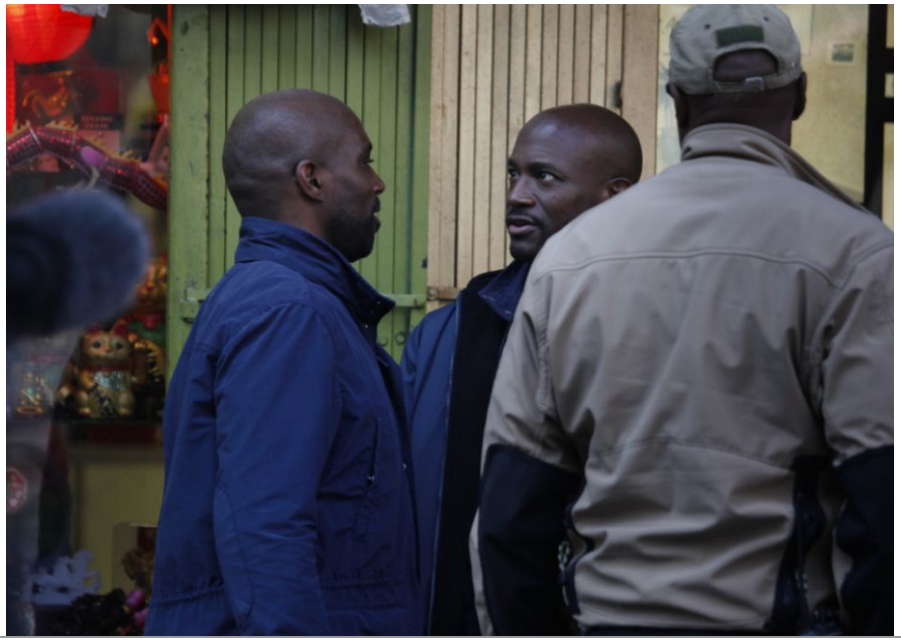

IMAGE 1 OF 3

Actor Taye Diggs, right, talks with Horace Knight, left, stunt double for Digg's character Terrance English, between shots on the set of TNT's "Murder in the First" while shooting a scene in San Francisco's Chinatown district.

There's a reason most people don't notice when a stunt double replaces Tom Cruise in a big action scene, and it's not that they're not paying attention.

The brain, says a team of UC Berkeley neuroscientists, is fine-tuned to filter out visual information that would otherwise overwhelm us and make us constantly work to recognize even ordinary objects or familiar faces.

The result is that we know we're looking at our mom even when her face is distorted by shadows or we're seeing her in profile — but we're also easily tricked by the movies into seeing a popular actor's face instead of his double's.

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"Without this mechanism, if we were talking to our friend and they turned their head or put on a hat, they might look like a totally different person," said Alina Liberman, a neuroscience doctoral student at UC Berkeley and author of a study published this month on this visual streamlining.

“If we didn’t have this mechanism, we would constantly lose track of each other since we would be noticing every change,” she said. “The world would look very chaotic.”

The UC Berkeley team refers to this visual trick as the “continuity field,” and it’s critical for humans’ ability to perceive and interact with their environment.

The human visual system is extremely sensitive and able to pick up on the smallest, fastest changes. Many of those changes are important for people to notice — a fly ball soaring toward the outfield, for example, or a child darting in front of a car.

But other changes are less important, and even distracting. The visual system picks up every tiny shift in light or lines when people look at a cup or a face from a different angle. If the brain tried to process all of that chaotic information at once, it’d quickly become overwhelmed. People would constantly be trying to figure out what person or thing they’re looking at, even if it was their own child.

The continuity field is the brain’s way of making assumptions that certain objects, including faces, don’t actually change dramatically over short periods of time. So it morphs together recent images — filtering out small changes like the shifting angle of a nose as a person tilts his head, or the tiny waves of hair in a mustache that’s ruffled by a breeze — and allowing people to perceive a relatively static picture.

“The brain knows that things in the physical world don’t change spontaneously — that if I’m walking with one person, there’s no way another person slipped in here,” said Jason Fischer, a postdoctoral fellow in neuroscience at Massachusetts Institute of Technology, who was part of the UC Berkeley team before he moved east.

“But there are changes happening all the time as you’re moving your head or your body,” Fischer said. “If we lacked the continuity field, we’d be bombarded and overwhelmed with change. This mechanism is smoothing over those changes.”

Here’s how that applies to the stunt double: Assuming the double looks fairly similar to the actor, most movie-goers will see — or think they’re seeing — the same face from one frame to the next. Their brains are primed to skip right over subtle inconsistencies between faces and see the familiar face they’re expecting.

'Continuity field’

The scientists proved their concept of the continuity field through a series of experiments this year. In the first study, published in March, subjects looked at simple graphic images. The second study, published this month, used faces.

For both experiments, subjects looked at dozens of images as they popped up on a screen one after another. Every six seconds they were shown a "target" image and asked to match that image with one out of a series that followed.

The scientists found that subjects didn't usually choose an exact duplicate of the target. Instead, they chose an image that combined the two most recent targets. In other words, their brains weren't latching on to the most accurate images, but rather images that were a meld of the recent past.

What the brain loses in accuracy, it gains in stability, Fischer said. So what may seem like a visual malfunction is actually a positive adaptation.

Visual stability is a survival mechanism, the scientists said. Recognizing faces is especially important — it allows for fluid social interactions and healthy relationships.

A world where people didn't recognize old friends, parents or even their own children would be extremely uncomfortable, to put it mildly, said David Whitney, an associate professor of psychology at UC Berkeley who was senior author of both experiments on the continuity field.

"If the world were unstable, things would fluctuate in appearance. We'd have double-takes all the time, and with everything — with cups, with glasses, with our kids," Whitney said. "Imagine how disturbing that would be."

In fact, "face blindness" does occur, although rarely. People with prosopagnosia may not be able to recognize familiar faces or tell unfamiliar faces apart. The condition can be devastating when people aren't able to recognize spouses or other close family.

Whether face blindness is the result of damage in the part of the brain involved in the continuity field isn't clear — for starters, scientists haven't yet determined what that brain region is.

It's far too soon to say whether this vision research will contribute to knowledge about neurological disorders or lead to tools for treatment or prevention. The scientists for now are interested in gathering more specific information about how the continuity field works and when it's applied.

Team's questions

For example, the UC Berkeley team is curious as to how the continuity field might affect the ability to perceive emotions on another person's face. If the brain is tuned to stabilize images and filter out extraneous visual information, what happens to the small changes in a face that express sadness, anger or excitement?

"We think we recognize emotions really well. We think if someone changes their expression we're really sensitive to it. But are we?" said Whitney.

"We think we're really sensitive to it, and that might be an overestimate," Whitney said. "It's the same with actors on a screen. If you ask an observer how confident they are that they'd notice a stunt double, they're totally confident. But they probably shouldn't be."

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