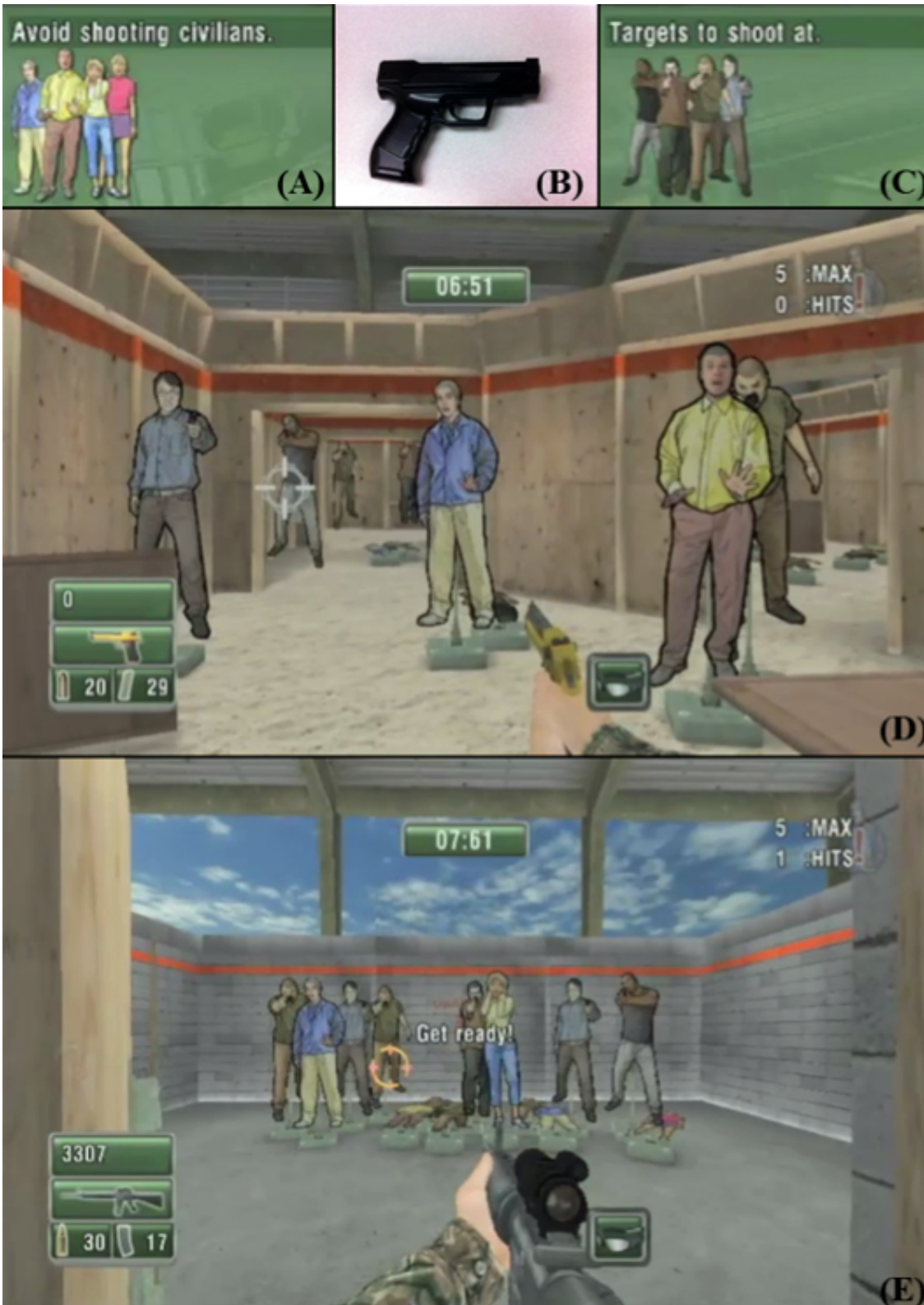


Brain training may help avoid civilian casualties

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A figure from the research paper shows screenshots of the video game played by study participants. The object is to shoot bad guys, not civilians. The researchers

say this is a problem of 'itchy brain' more than 'itchy trigger finger.' Credit: Adam Biggs, Duke University /

Although firing a gun seems like one action, it is made up of many smaller decisions and movements that require coordination between multiple brain areas.

The sudden decision to not shoot, called 'response inhibition,' is critical when someone innocent comes into the line of fire. That is what soldiers in war experience when they're about to pull the trigger and then realize that their target is a civilian or an ally. Or when a law enforcement officer realizes that a person they thought was armed and dangerous is actually an innocent bystander.

A new Duke study exploring the causes of civilian shooting casualties suggests that mistakes arise from problems with attention—an "itchy brain," the authors say—rather than an "itchy trigger finger."

The findings, published online in *Psychological Science*, imply that the tendency to squeeze the trigger in error can not only be predicted with [cognitive tests](#) but can also be overcome by [training](#) in response inhibition.

"Shooting a firearm is a complex activity, and when you couple that action with the conditions encountered by military and [law enforcement](#) personnel, firearms training can be even more complicated," said Adam Biggs, a visiting scholar at Duke's Center for Cognitive Neuroscience. He has been working in the lab of Stephen Mitroff, an associate professor of psychology and neuroscience and a member of the Duke Institute for Brain Sciences.

"Cognitive tests and training offer some exciting new methods for enhancing shooting abilities, and thereby avoiding some of the most critical shooting errors, such as [civilian casualties](#)," Biggs added.

In the new study, 88 young adults played a simulated shooting game on Nintendo Wii called "Reload: Target Down." (Reload is published by leading video game company Mastiff, which is led by 1987 Duke alumnus Bill Swartz.) The objective is to shoot armed people as quickly and as accurately as possible, while avoiding unarmed civilians.

After playing, the participants took surveys that assessed their ability to pay attention, signs of motor impulsivity such as finger tapping or restless behaviors, features of autism spectrum disorders and other characteristics. Individuals also took baseline computerized tests of their ability to withhold responses and to do visual search.

The scientists found that the more attention problems a person had, the more likely he or she was to shoot civilians in the simulation. Motor impulsivity, in contrast, did not predict the number of civilian casualties.

The study also included some cognitive training to see what might make a difference.

One group underwent training designed to prevent civilian casualties by enhancing response inhibition through a series of computer-based exercises. The other group underwent cognitive training unrelated to the shooting task to show whether any kind of training sessions would make a difference. Each training group completed three hour-long sessions over the course of three days.

On the last day of the study, all of the participants played the [shooting game](#) again. The scientists found that people who had completed response inhibition training shot fewer civilians than they did before

training. In contrast, the control group's performance was unchanged.

One potential concern about response inhibition training was that participants were simply trained to shoot less. But, "that answer is a definite 'no,'" Biggs added. "The people in response inhibition training shot more of the right targets and fewer of the wrong ones during their post-training simulations."

In addition, the more attention-deficit hyperactivity disorder (ADHD) symptoms a subject reported, the more likely he or she was to improve with response inhibition training. That was not true for the group that had training in visual searching as an experimental control.

The researchers now hope to determine which aspect of the response inhibition training made the difference. They will also try to see how long the training might last.

"This study serves as an exciting and important first step, and it opens the door to a wide variety of additional studies into shooting and cognition," Biggs said.

More information: "Cognitive training can reduce civilian casualties in a simulated shooting environment," Adam T. Biggs, Matthew S. Cain, Stephen R. Mitroff. *Psychological Science*, July 13, 2015. [DOI: 10.1177/0956797615579274](https://doi.org/10.1177/0956797615579274)

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