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“Excessive” shots and falling assailants: A fresh look at OIS subtleties

A new look at why officers often fire controversial “extra” shots after a threat has ended has been published by an independent shooting reconstructionist and certified Force Science analyst.

Researcher Alexander Jason reports that even under benign experimental conditions brain programming compels roughly 7 out of 10 officers to keep discharging rounds after being signaled to stop shooting. “In a real gunfight, under extraordinary stress and threat of death, an even much higher percentage would likely deliver extra shots,” Jason asserts.

On average, additional findings show, officers may “reasonably” fire 6 rounds or more into suspects who initially are standing and then begin falling and who, in fact, may already be mortally wounded. And that’s 6 rounds per officer involved in the confrontation.

“Understanding why this occurs can be critical in shooting investigations and in criminal proceedings and civil lawsuits that allege excessive force by officers for firing ‘too many’ shots,” says Dr. Bill Lewinski, executive director of the Force Science Institute. “As Jason explains, so-called ‘extra’ shots are generally beyond an officer’s control. They’re more likely to be an involuntary reaction under stress than a conscious decision with malicious motivation.”

About 7 years ago, Lewinski performed widely cited experiments in Tempe, AZ, that documented the tendency of officers to “over-shoot,” that is to discharge 1 or more additional rounds after perceiving a stop stimulus during rapid-fire discharges. (Click [here](#) to read about the study.)

Jason's work, conducted in California, essentially confirms some of the Tempe factors and adds important new elements. His full report appears in the current issue of Investigative Sciences Journal, a peer-reviewed professional quarterly, and can be downloaded free of charge in pdf format at www.investigativesciencesjournal.org. Click on the paper, "Shooting Dynamics: Elements of Time & Movement in Shooting Incidents."

Background

A crime scene analyst specializing in shooting analysis and reconstruction, Jason heads the Anite Group in Pinole, CA, and has been involved in a number of high-profile cases, including New York City's Sean Bell incident in which a prospective bridegroom was killed shortly before his wedding in a fusillade of 50 rounds fired by undercover and plainclothes officers.

Jason, formerly with the San Francisco PD, told Force Science News that he has sporadically conducted research tests related to officers and shooting dynamics across a number of years, but decided to compile and publish a summary of results only after graduating last year from a certification course in Force Science Analysis. He included his latest experiment, performed just a few months ago, on how long it takes a human body to fall from a standing position. This is a subject that the Force Science Research Center is also investigating.

Time to Stop

The core of Jason's paper is his research on how long it takes an officer in rapid-fire mode to stop shooting once he perceives that he should do so.

The test subjects were 32 officers (30 of them male), ranging in age from 23 to 56, with the median age 33. They averaged nearly 11 years' service, but ranged in experience from less than a year to more than 2 decades.

Using the semiautomatic pistols and leather gear they normally wear on duty, they one at a time faced a "hostile man" target at a distance of 5 ft. Hands at their side, they were told to draw and "start shooting at the buzzer. Shoot as fast as you can," and stop shooting when 2 100-watt spotlights pointed at them flash on. An electronic shot-timer provided the start signal and the "stop" lights came on at random intervals, after a minimum of 4 intended shots.

"Most of the officers were unable to immediately stop shooting at the stop signal," Jason reports. Indeed, 69% fired at least 1 "extra" shot, with 17% firing 2 extra and 8% firing 3. Fewer than 1/3 were able to stop fast enough to prevent discharging surplus rounds.

Although the shooters “reacted as quickly as they could,” Jason writes, most continued to pull the trigger past the stop signal “because the brain-to-trigger finger impulse was still ‘in motion.’ ” In other words, they could not perceive the light signal, transmit that perception to the brain, have the brain interpret it, and send back a “stop” command before the trigger finger was already proceeding with subsequent shots based on the mental program that had been put in action by the start buzzer.

Benchmark findings by other researchers, cited by Jason, suggest that as a rule of thumb the brain may need about 3/10 of a second to evaluate an incoming stimulus, and then at least 16/100 of a second minimum to “inhibit (cancel) an anticipated action (like firing the next shot).”

Such reaction times, of course, vary among individuals. And if an officer does not instantly see a stop signal because his visual attention is narrowed and intensely concentrated on his sights and/or the target, the delay in responding can be much longer, Jason explains.

Extra Shots on the Street

Jason writes: “It is important to compare and note the different effects on performance between the conditions facing a shooter in [the] safe and relatively stress-free [experiment] with an urgent, life-threatening and highly stress-inducing situation [of] a real-life shooting incident.

“The shooters in the test only had one, clearly defined stimulus to stop firing.... A shooter in a genuine shooting incident will [experience] both a higher level of physiological arousal (stress) and additional choices (Should I take cover? Is the target person no longer a threat? Should I look around for other threats? Are there others who may be exposed to my gunfire?, etc.).

“Human performance research has determined that as the number of choice alternatives increases, reaction time (including perception, decision, and action) will increase. The elevated arousal and multiple-alternatives effect will likely cause the shooter to fire additional ‘extra’ shots—more than [were] measured in this test study.”

Lewinski found in the Tempe study that the more motivated a shooter was to shoot, the longer it took before he was able to stop shooting. “And an officer firing to save his life is about as ‘motivated’ as a human being can be,” Lewinski says. “Once the human dynamics of ceasing shooting under stress are understood, the less sinister the connotation of ‘extra’ shots generally will seem.”

Time to Fall

In his most recent study, Jason measured the amount of time required for a person to fall to the ground from a standing position and explored the implications of shots fired by officers at the falling figure, whether those shots are deliberate or involuntary because of reaction time.

During a confrontation with a standing armed offender, “the most commonly understood and accepted indication that the [suspect] is no longer a threat is when that person either releases the gun from his hand(s) and/or drops to the ground” from being shot, Jason states.

He asked 5 volunteers (4 males, 1 female) to stand “erect with hands out in front, as if holding a gun” and, upon verbal command, to drop to a padded mat “as quickly as possible.” This, he concedes, was an imperfect attempt to mimic a rapid collapse (“dropping like a sack of potatoes”) such as would occur from “a significant disruption of the central nervous system or sudden loss of consciousness.” Genuine collapses from such causes, of course, cannot be tested in an experimental environment.

Thirty-five drops were recorded with a digital video camera and later analyzed on a computer. Timing began “at the first detectable motion initiating the movement of the body” toward the ground and ended when the upper torso was on the mat and “horizontal to the ground.”

On average, the subjects took 1.1 seconds to fall down. During this amount of time, Lewinski’s research has shown that “4 shots could be fired by an ‘average’ police officer,” Jason writes. “A crumple fall [going to the knees first, then down] will take more time and could result in several more shots fired during the movement. Additional shots could also be fired until the shooter perceives that the person is no longer a threat and is able to interrupt his shooting sequence.”

In all, Jason writes, “the total number of [rapid-sequence] shots fired at a person standing then going to the ground could reasonably be a minimum of 6 shots: 1 or more before the [suspect] begins to fall; 4 shots during the fall; 1 or more as the body contacts the floor” during the time required for the brain to recognize and process that the threat has ceased.

“In situations with more than one shooter firing, the total number of reasonable shots could be 6 x Number of Shooters; i.e., if 3 officers were firing simultaneously, then 18 shots (6 x 3) would be expected....etc.”

Depending on a suspect’s positioning through the fall, at least some of these shots may end up entering through his back, Jason points out, deepening the illusion that the shooting was an unjustified “execution.” In his paper, he includes graphics showing how “posterior entries” can innocently occur under these circumstances.

Further Considerations

Apart from the reaction-time phenomenon, a falling assailant may invite continued gunfire because a collapse or crumple can be an ambiguous movement. Falling from incapacitating wounds cannot always be “distinguished from a deliberate tactical maneuver of someone who has decided to go to ground to avoid being shot or to assume a less exposed position while returning or preparing to return gunfire,” Jason writes. “Even a mortally wounded person can fall to the ground and fire one or more shots before becoming incapacitated and/or unconscious.”

Moreover, because of the nature of bullet wounds an officer may not know whether his rounds are hitting his assailant—another motivation to keep shooting. Jason explains:

“There is no significant momentum or ‘push’ from a bullet strike. This means that there would be no significant...motion effect of a bullet striking a standing or falling person.... Also...unlike the shootings seen in dramatic films and TV shows, it is most often not possible to visually determine if a shot has actually struck a target person. Bullet entry holes do not project large amounts of blood and the defect in the skin—always smaller than the bullet diameter—may not be visible at all if the shot was fired through clothing, particularly loose or layered clothing.”

In short, Jason concludes, police shootings can be complex occurrences. For persons untrained in forensics and the science of human behavior to jump to conclusions in judging an officer’s actions can lead to grave misinterpretations and injustices.

“Jason is to be congratulated on his work,” Lewinski says. “More research is starting to be focused on street-level law enforcement issues, and with every effort our understanding of the dynamic interplay between officers and their assailants becomes that much clearer.”

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On a global sidenote...

First attendee from China graduates with Force Science certification

Andy McGrenra has set a Force Science record! A chief inspector with the Hong Kong Police Force, situated on China’s south coast, he recently traveled from the most distant point so far to attend a certification class in Force Science Analysis.

McGrenra was one of 52 students who graduated in February from the class hosted for the Force Science Institute by the San Jose (CA) PD, nearly 7,000 miles from his home base. Other students represented 33 agencies from 14 states and Canada. Sixteen departments sent multiple trainees.

Since 1994 McGrenra, originally from the United Kingdom, has been with the Hong Kong police, an agency with more than 27,000 sworn personnel serving a population of 7.2 million. He currently is second in command in the Weapons Training Division, overseeing some 160 full-time use-of-force instructors and 40 civilian staff.

Among his responsibilities is to give expert-witness testimony regarding use-of-force incidents under investigation. The knowledge gained from his new certification, he told Force Science News, is “invaluable. With officers’ lives and careers on the line, I feel duty-bound to provide as much information regarding force encounters as I can. There is no excuse for information like this being available and not being gathered and applied.”

He hopes also to share his Force Science insights with the independent Police Complaints Council, a civilian group mandated by law to review public grievances against Hong Kong officers.

Police in Hong Kong are involved in 4-6 shootings a year, on average, McGrenra says. In preparing to survive them, the force fires more than 14,000,000 rounds per year in training.

Written by Force Science Institute
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