WHY IS THE SUSPECT SHOT IN THE BACK?

Finally, Hard Data on How Fast the Suspect Can Be In 11 Different Shooting Scenarios

By Bill Lewinski, Ph.D.

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We have always known that generally action beats reaction. And, we've been able to demonstrate this in a variety of civilian and law enforcement situations. Since the invention of the shot timer, we've known how quickly officers can react in shooting situations. Now, for the first time, we have accurate, sophisticated measurements on how quickly the suspect in the street can actually do what they do in 11 different kinds of shooting scenarios. Some of you may find the results depressing, for this research proves that in the street, action really does beat reaction. For others, it will provide a clear explanation for problems, such as why so many suspects get shot in the back. Readers should find the results of this study truly amazing – the implications for law enforcement training are profound.

In a previous article in *The Police Marksman,* (September/October, 1999) Dave Grossi and I present my research data on three movements subjects have done in officer-involved shootings. In this current research those movements have been modified to make them more consistent with some types of street shooting situations. This research also measures the time for suspect movement in 9 other street shooting situations.

It's important for readers to remember that the average officer, with his finger on the trigger, and being psychologically set, is able to "react" to a shot timer and pull the trigger of his weapon in about a quarter to a third of a second. I'm currently working on research on this topic with an entire police department, and the preliminary data indicates it is closer to a third of a second or even longer for most officers to react (at least with that department). Some officers are quicker and others are slower. Keep this "average" reaction time in mind as you read about the different motions studied, and learn just how fast the suspects' action can be.

The purpose of both the current and previous research was not to replicate any specific shooting situation, for this would be functionally impossible. It was not the intent to come up with measurements that could represent all population samples, for instance from the young to old and the fit to unfit. Instead, the approach was to begin to come to an understanding of some of the time parameters of the specific motions studied, so that more intelligent conversions can be conducted regarding officer shooting situations by tactical instructors, internal affairs or shooting review boards, attorneys and judges. This is not a study on the biomechanics of shooting. For instance, in the combat tuck shooting motion, the concern was only with the time of the motion. The timer started when the subject started his motion, and ended when the camera recorded the discharge of flame from the barrel. Whether the subject pulled from the elbow or shoulder was not relevant to this study, or whether he rolled the weapon over his belt and discharged it, or pulled it high and then dropped it low. I was simply concerned with

beginning to define the time parameters so the law enforcement community can now know how fast these motions really can be.

The population for the study was 25 subjects who, for the most part, were undergraduate majors in the Law Enforcement Program at Minnesota State University, Mankato. Most of the subjects had not received firearms training or ever handled a firearm. All of the motions in the study were self-initiated, and therefore were "action" motions to which an officer would presumably be "reacting." The weapon used in the study was a Smith and Wesson .22 caliber revolver, armed with black powder blanks.

Each subject did five repetitions of each motion. The motions were recorded on a Canon GL1 digital video camera in the frame mode. The speed of the camera was 30 frames per second. The camera and motions were cross-matched with a digital timer that was accurate to 1/1,000th of a second. The error factor in the timing is a plus or minus 03/100^{ths} of a second for each of the motions studied.

A more extensive statistical analysis than is present in this article is available. However, the most important data for officers to know is the average time, and specifically the fastest time in which these motions can be done. In an actual street encounter, an officer will never know whether he is facing the fastest, slowest or just the average person. The only way an officer can ensure his survival is to prepare for, and react as if he's facing the fastest person out there. All of the motions studied here have come from actual officer-involved shootings, and reflect the real – life threats or circumstances.

1 GUN AT COUSOLE/CROSS BODY/DRIVER'S WINDOW DISCHARGE

15/100^{ths} of a Second

The first motion studied simulated a vehicle stop where the suspect has a weapon hidden beside the right thigh/next to the console, and shoots at the officer as he approaches the driver's side doorpost. The subjects were instructed to hide the gun by their right thigh. Then, on their own initiative, to move the weapon from the right thigh position, across the body, point it slightly over and to the rear of the left shoulder and discharge the weapon. They were instructed to do this as quickly as possible. The average time from start to discharge was 25/100^{ths} of a second. The fastest time for this motions, and there were several subjects, who were close to this, is 15/100^{ths} of a second, or almost twice as fast as an average officer can pull the trigger on his weapon, if he is set with his finger on the trigger and ready to fire. If in this scenario, the "reactive" officer has his weapon drawn and in the "bootleg" position, he doesn't

stand a chance to react and return fire before at least one, and more likely three or more rounds are fired in his direction.

2 GUN AT COUSOLE/CROSS BODY/PASSENGER'S WINDOW DISCHARGE

09/100ths of a Second

The Second motion studied was another automobile simulation, where the suspect is in the front passenger's seat and has reached across his body to the console position with his right hand. The suspect then pulls the weapon from beside the left thigh/console position, swings the barrel of his weapon across his body and back, so it is pointed to the rear of his right shoulder. He then discharges the weapon toward the passenger's side doorpost. This simulates a shooting on a passenger side approach, by a suspect who has a weapon hidden near the console. The Average time for this motion was 26/100ths of a second, with the fastest time being 09/100ths of a second. This is three times faster than the average officer (who is set to fire) can pull the trigger.

3 GUN IN WAISTBAND/COMBAT TUCK/DISCHARGE

09/100ths of a Second

The third and fourth motion studied involved the "furtive" threatening motions where the subject reaches toward the waistband – presumably for a weapon. In this third motion, the subjects were requested to place the weapon in their waistband and then, on their own initiative, pull and fire in a very close "combat tuck' maneuver. Again, the timing started with the first frame in which movement occurred, and ended with the first frame recording the weapon discharge. This is a definite skill maneuver, and would get faster with practice, but the subjects were not allowed to practice. As is, the average time, from the start of the motion to discharge, was 23/100ths of a second, with the fastest time being 09/100ths of a second, or about three times faster than the average officer would be able to pull the trigger if he were to react to

this movement. An officer caught in the open in a "Dodge City showdown," (with even the average subject in this study) literally would not stand a chance if the subject has his hand at his waistband, an actual weapon in that waistband, the intent to shoot, and any accuracy at all with his weapon.

4 GUN IN WAISTBAND/ARM EXTENDED/DISCHARGE

09/100^{ths} of a Second

The fourth movement involved the same waistband position, but this time the subject was to pull the gun from the waistband, extend the arm fully and discharge the weapon. The average time for this motion was 26/100^{ths} of a second, with the fastest being 09/100^{ths} of a second. Again, this is three times faster than an officer who is already set with target acquisition and finger on trigger can react with a trigger pull. There was a very tight distribution on this motion and the vast majority of subjects were able to fire their weapons before the time the average officer would've reacted and fired theirs.

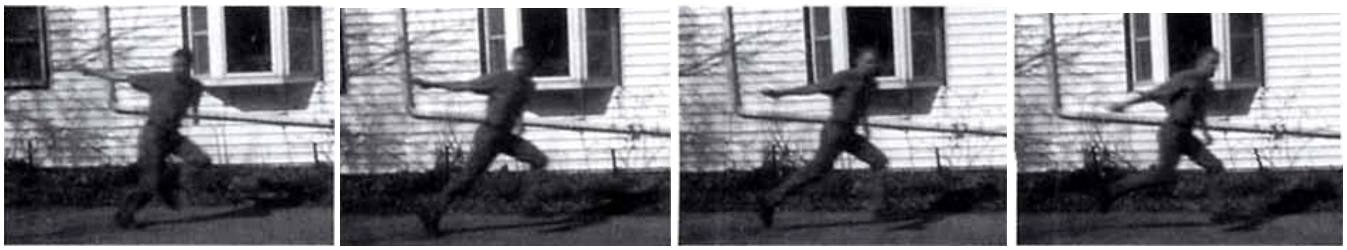
In a street situation involving the "furtive" move to the waistband, if the officer had a finger on the trigger and waited before firing until the average suspect initiated a movement pulling the weapon out of the waistband, the two bullets would pass each other in the air. If the suspect was as fast as some of the subjects in the study, the officer would not even be able to think of squeezing the trigger before the suspect would have fired his weapon. Further, if an officer were to wait to identify that the suspect actually did have a weapon, the fastest suspect would be able to discharge at least two rounds before the average officer could react with one. The implications for officer safety are profound.

The next series of movements involved suspects running away from an officer and then turning back in some fashion, firing at the officer and coming back into a full run position. In my previous research, I had looked at the time to complete the full motion of turning, pointing, firing and then returning to the running position. Suspects in the street may or may not "throw shots" back at an officer in this fashion. It is equally probable for the suspect to, while running, hold the weapon pointed at an officer and fire several times before he pulls back into a full forward running position. Therefore I needed to start the timing of the motion from the point at which the suspect would no longer be a threat to the officer. Also, it seemed more important to determine when the suspect's back might be fully exposed to the officer, so the officer's round would directly enter the back at an approximate 90-degree angle rather than the time in which

the subject was again into a full running position. Subsequently in the next movements, (numbers 5, 6 and 7) the measurements begin when the subject's back is directly exposed to the officer, so a bullet would enter at approximately a 90-degree angle.

5 GUN EXTENDED BACK STRON SIDE/DROP OFF TO SQUARE BACK

00/100ths of a Second



The fifth movement was a recreation of a shooting scenario with a suspect running away from an officer. The weapon in his strong arm, pointing the weapon back on his strong side, toward the officer, firing at the officer and then coming back into a full forward running position. The subject in the study was instructed to run away from the "fictional officer," point the gun back, pull the trigger and then bring the weapon back into a bent arm running position. All of this was to be done as quickly as possible. Because suspects in the street could shoot one or more rounds at an officer before turning to a full forward motion, the timing of the movement started after the subject pulled the trigger and then moved into the "drop off" position where the barrel of the weapon would no longer be pointed directly at the officer, and subsequently no longer be an immediate, direct threat. This "drop off" position was the start of the return of the arm to a running movement, and happened in different ways. Sometimes the subjects simply turned the barrel as they started to bring the weapon forward and into the arm position for running. Sometimes they dropped their hand by a few inches or twisted it away. The timing of the motion ended when the subject had returned to a "square back" running position. The "square back" position is one where the subject would be moving in a straight line directly away from the officer and in the same direction as the officer would be facing. The "square back" would be at an 80-90 degree shoulder angle to the lateral plane of the movement of the subject. In this study, in almost all subjects, the hip or waist was often "square back" to the "officer" for the full motion of rotating and shooting, and did not shift from this position, so the measurement for this study was done on only the shoulder axis. Even in the full 90 degree "square back" position almost all subjects had a slight forward lean to their upper body. The angle of forward lean was not measured in this study. All actions were completed and the measurements were done within 20 yards of the subject starting to run.

The usual time from the frame where the weapon was directly pointed back at the officer in "discharge" position to "drop off" was one frame or 03/100ths of a second. Subsequently there was very little difference in overall time from 'weapon discharge" to "square back" and "drop off" to "square back."

In this fifth movement or "strong arm back" position, the average time to go from the

0/100ths of a second. In other words, in the fastest return, the subject had flexible shoulders and was able to extend the arm back without much upper body rotation. From this position, the mere act of changing the direction of the barrel seemed to release the pressure on the shoulder, and let him return to a full "square back" run position immediately. In general, regardless of how fast the subject was running, he was able to return from a "weapon discharge" position within half a stride or a little more. In some cases the subject's back was so square to the "fictional officer" as they were shooting, that even if the officer was to discharge his weapon at the subject as the subject's weapon was pointed at them, and continued to be trained at them for all intents and purposes, the bullet would still enter the subject's back at very close to 90 degrees.

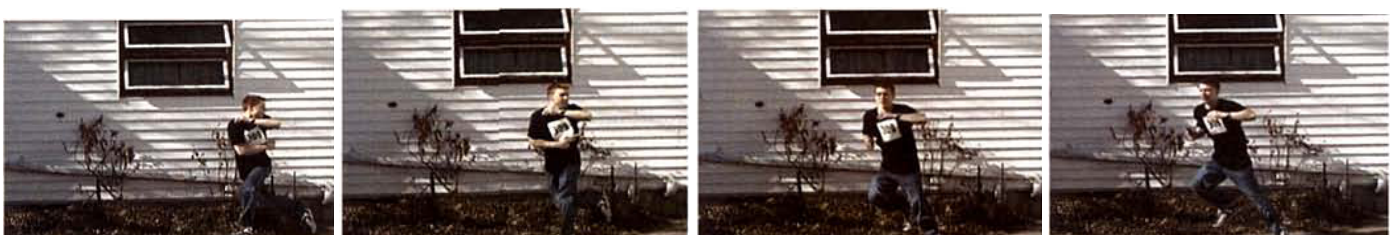
6 GUN CROSS BODY/OVER SHOULDER/DROP OFF TO SQUARE BACK

00/100ths of a Second

The sixth movement was a recreation of a shooting scenario with the suspect running away from an officer with the weapon in his strong arm. The suspect then looked over his weak side shoulder, brought the weapon across the body, pointed it back toward the officer, over his weak side shoulder, discharged the weapon and pulled the weapon and hand back into a bent arm run position. The subjects were instructed to do this motion as quickly as possible. The timing started from the weapon "drop off" position and ended when the subject was square backed. The drop off position here was the turning away of the barrel from the direction of the officer – however that was accomplished. The average time to return from the "drop off" position to a full "square back" position was 09/100ths of a second. Again, the fastest was 0/100ths of a second. In some subjects the drop off of the weapon was all that was needed to return them to the position where if an officer was to hit them with a bullet at that point, the bullet would enter at an approximate 90 degree angle to the lateral plane.

7 GUN CROSS BODY/UNDER ARM/DROP OFF TO SQUARE BACK

00/100ths of a Second



The seventh movement was a recreation of a shooting scenario with the suspect running away from an officer, with the weapon in his strong arm. The suspect then looks over his weak side shoulder, brings the weapon across the body and under the arm/shoulder of the weak side. The suspect then points it back toward the officer, discharges the weapon and pulls the weapon and hand back into a bent arm run position. The subjects were instructed to do this as quickly as possible. The timing started from the weapon "drop off" position and ended when the subject was square backed. The drop off position here was the turning away of the barrel from the direction of the officer – however that was accomplished. The average time to return from the "drop off" position to a full "square back" position was 13/100^{ths} of a second. The fastest was 0/100^{ths} of a second. Again, in some subjects, the drop off of the weapon was all that was needed to return them to the position where, if an officer was to hit them with a bullet at that point, the bullet would enter at an approximate 90 degree angle to the lateral plane.

Regardless of how the weapon was pointed back at the "fictional" officer as the subject ran away, it was apparent in most subjects that almost no hip rotation and little shoulder or upper body rotation was used to point the weapon back at the officer and shoot. The consequence of this is that any officer who shoots a subject in this position – either when the weapon is pointed at them or in immediate reaction to that pointing, will hit the subject in the back at very close to a direct 90 entry from the lateral plane of the back. This is a very different angle of entry than the average, uninformed civilian, law enforcement officer or officer or the court would expect.

8 90 DEGREE TURN/WEAPON DISCHARGE/SQUARE BACK

50/100^{ths} of a Second

The eighth movement is the 90-degree turn. In this study the subjects were positioned so they were in front of the camera and facing at a 90-degree angle to the officer/camera, with a weapon in their strong hand and positioned down by their thigh. They were instructed to do the 90-degree turn, and during this turn to actually point the weapon at the officer/camera and pull the trigger. Again, we were not studying the biomechanics of the motion, but simply beginning to establish the time parameters of the motion. It is noteworthy that, in this as well as in all the other motions studied; each person had his own unique way of doing the general movement. Some subjects raised the weapon toward the camera/officer pulled the trigger and turned; others dropped or "charged" their body then started to turn and raise the weapon, all in one motion; others started to turn first and then raised the weapon. Some subjects turned by almost

spinning in place and then running away. Others ran and turned and took more than 10 yards to reach the shoulder "square back" position. The timing of the motion started with first frame the weapon began to move as the subject started to bring it into motion from beside the thigh. The timing stopped when the subject was within 10 degrees of a full square back position facing away from the officer/camera.

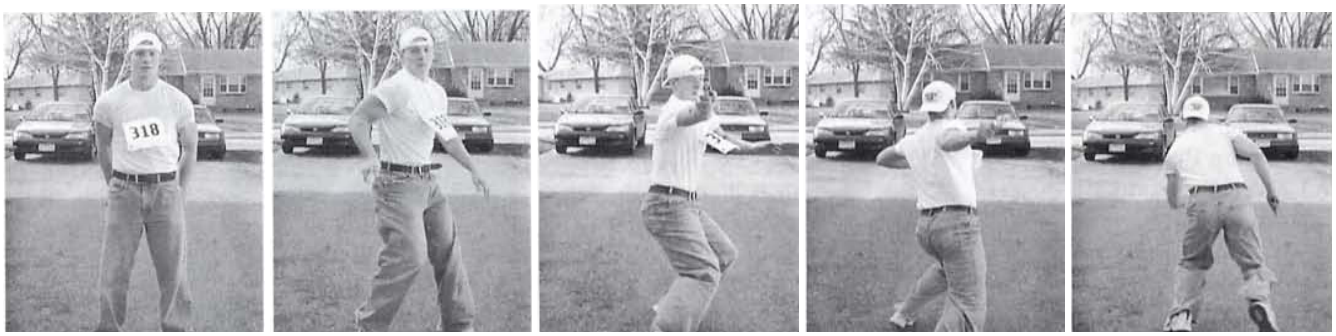
In my previous study, the subjects were measured on simply turning. This study had some "street encounter" emphasis in that the subjects had a gun in hand and most accidentally swung or in some way raised the weapon at the officer/camera as they turned. This reflected a street encounter in which the suspect did not intentionally point the weapon at the officer and discharge it, but did threaten the officer. There have been an undocumented number of street encounters like this where the suspect was armed, facing or walking at a right angel to the officer, and then the suspect initiates or continues his motion into a 90 degree turning movement where they are subsequently facing or moving directly away from the officer. The suspects in these encounters invariably swing the weapon as part of the turning movement. The swing then results in the weapon, at some point, being pointed in or beginning to be pointed in the direction of the officer. The suspect never does discharge the weapon, but by the time the officer has reacted, to believing the weapon is going to be pointed and shot, the suspect has turned and is shot in the back. In my previous study, the average time for the subject to turn 90 degrees was 32/100^{ths} of a second with the fastest being 18/100^{ths} of second.

Because of the more complicated and extensive motions the subjects went through in this study, the time for the 90 degree turn was relatively much greater than in previous studies but more accurately represents a more dynamic, realistic street encounter, where the suspect actually shoots at the officer. The average time for this motion in this study was 90/100^{ths} of a second, with the fasted being 50/100^{ths} of a second.

A second set of times was taken for each movement to assist in more clearly understanding the 90-degree turn and how it might interface with the threat to the officer and the officer's reaction time. The average time, from start of the motions to discharge and "weapon drop off," was 53/100^{ths} of a second. The average time from weapon "drop off" to the full square back position was 37/100^{ths} of a second.

9 180 DEGREE TURN/WEAPON DISCHARGE/SQUARE BACK

50/100^{ths} of a Second



The ninth movement is the 180-degree turn, and is similar to the 90-degree movement studied previously, in that it more accurately reflected a street encounter where the suspect engages in a more dynamic turn and actually discharges a weapon at the officer as they are turning. In this study, the subject was instructed to start by facing directly at the camera/officer with the weapon in a concealed, bootleg position beside and behind the strong side thigh, then to do the turn and actually point the weapon at the officer/camera and pull the trigger. As in the 90-degree study, the motion was very dynamic, varied among subjects, and sometimes covered quite a distance before the subject achieved a full "square back" position.

In my previous study with just the pure motion of the 180-degree rotation, and with subject (weapon in hand), but only inadvertently pointing it at the officer, the time was 54/100^{ths} of a second, with the fastest being 37/100^{ths} of a second. In this study, the subject directly pointed the weapon at the officer and pulled the trigger while turning. The average time for this more dynamic motion was 89/100^{ths} of a second, with the fastest being 50/100^{ths} of a second. From the start of the motion to drop off, the average time was 48/100^{ths} of second. The fastest time was 40/100^{ths} of a second. From "drop off" to square back position the average time was 42/100^{ths} of second. The fastest time was 10/100^{ths} of a second.

10 180 DEGREE TURN WITH MOMENTUM/POINT GUN/SQUARE BACK

33/100^{ths} of a Second

The tenth motion studied involved the subjects doing a specific movement out of a door and then a 270-degree turn. This turn is interesting because it was done in close proximity to a wall. That significantly affected the rotation and the direction in which the weapon was pointed. All the subjects held the weapon in the direction of the officer for much of the turn as they rotated close to the wall. I also analyzed the main motion and sub portions of the motions to be able to extract portions of the turn such as the quarter turn from "drop off." The main result from this study was the time for a dynamic 180-degree turn. In the midst of the 270-degree turn, the subjects were instructed to point the weapon directly at the officer/camera and continue their motion to 180-degree turn in the opposite direction from the officer, and run away from the officer. The average time for this dynamic 180-degree turn is 58/100^{ths} of a second. The quickest was 33/100^{ths} of a second. It is also interesting that subjects doing this maneuver covered a long distance before actually completing the turn. Not one subject simply pivoted and turned. Most subjects covered 6 to 10 feet to accomplish this motion in the time

reported. I presume this 180-degree turn is faster than the 180-degree turn looked at in motion #9, because the subjects in this segment had already developed momentum before they started into this 180-degree turn.

11 360 DEGREE TURN

60/100^{ths} of a Second

The eleventh motion studied was a 360-degree turn, which has happened in a small number of shooting situations where the suspects were shot as they were attempting a 180-degree turn. The suspects then continued the rotation after they were shot and fell to the ground face up. The subjects in this study did not fall to the ground, but they did complete a 360-degree turn. They were instructed to do this as quickly as possible. This motion in particular covered a long distance especially by some subjects, and subsequently the average time was just under 3 seconds. Some subjects traversed almost 15 yards before completing the motion. The closer approximation to a more realistic street encounter, where these shootings have actually occurred, was a time of just under a second. The fastest time of 60/100^{ths} of a second was done by a subject who traversed about 4 feet as he did; the 360-degree turn.

By studying the "dynamic" rotation, while the subjects were doing a 90, 180 or 360 degree turn, not only can we see that the subjects would be shot in the back if they were actually in a street encounter, and the officer was to really "react," also, the subjects would be shot at quite a distance from where the officer said they were when the officer made the decision to fire. This study makes it very clear that regardless of the best intentions of the officer, given what the suspect is doing, and how quickly he can do it, the suspect will be shot in the back in some situations.

All of the responses of the average officer referred to in this study assumes that he is set, and had made the decision to shoot as soon as the subject presents a threat to him. It also assumes the officer is completely focused on the subject and then is able to react to the first movement of the subject. In the real world this may not be the case – the officer is then forced into playing "catch up." This is really dangerous; particularly now that we know how rapidly these scenarios can develop.

Readers of this article may believe that regardless of how alert or set an officer is to react, the only way to survive some of the situations in the street is to triple the reaction time of their trigger pull. This is impossible. Realistically, the way an officer can survive the "Dodge City

Showdown" or being a victim of the "Split Second Syndrome," is to (as much as they can) prevent these circumstances from happening at all. If there is one primary lesson for the officer to take from this study, it is the value of good basic officer survival skills, such as pre-event decision making, visual and mental alertness, tactical positioning, and always having the suspects keep their hands in plain view. Other supportive tactics like those taught in their academy, presented in magazines like *The Police Marksman* and in texts like **The Tactical Edge** would all be helpful for an officer to survive the unknown threat in the street. So much of any sophisticated skill is always based on a solid foundation of basics.

About the Author

Dr. Bill Lewinski has a doctorate in Police Psychology from Union Institute in Cincinnati, Ohio. He is a professor in the Law Enforcement Program at Minnesota State University, Mankato, is on the National Board of Examiners with Goju-Kai Karate-Do USA, and is an ex-lecturer & contributing expert to the Street Survival® Seminars & The Tactical Edge. He lectures and testifies extensively in the area of Performance Psychology in force related matters.

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