

STRESS REACTIONS

Related to Lethal Force Encounters

By Bill Lewinski, Ph.D.

The purpose of this article is to help officers who have been or may become involved in a lethal force encounter to understand what might happen and why. I will not predict the reactions of any specific officer to these encounters, but I will reveal the latest research in relation to this topic, as well as explain the adaptive nature of the reactions.

History and Prevalence

The impact of stress on performance has been a topic of study since antiquity. In fact, every profession that performs in a high stress environment, whether it's NASA astronauts or emergency room physicians, is aware of the impact it has on performance and judgment. The body of scientific literature on this issue dates back to the early 1900's when theorists were trying to determine what piece of information in the items we observe are able to catch our attention, and how they affect our interpretation of the items. The study concerned with these concepts was known as "perception." In the 1950's the area of study that focused on understanding these concepts remained perception but also began to be researched by psychologists interested in "attention." A significant body of literature can be found from that point until now under both titles. In the mid 1950's psychologists interested in perception began to pay attention to the role of emotion in perception. There are thousands of articles on the influence of emotions on perception.

In the 50's the involuntary nature of attention as it related to intense, novel, emotional, or significant events began to draw research interest. Psychologists were becoming more aware of perception and specifically, that the narrowing of perception was a product of the receptor, (e.g. the eye or ear) and a product of the mindset or focus. Fear, panic, anger began to be recognized as having an influence on perception. Industry, particularly aerospace, was interested in the focus and attention problems of humans under the stress of intense or significant events. For instance, the engineers designing cockpits in fighter planes

began to accommodate for the deterioration of human performance in stress by simplifying instrumentation and design. The industrial psychology literature of the 50's and 60's focused on creating environments that made adjustments for human perceptual, cognitive and physical rigidity, and aberrations during high stress.

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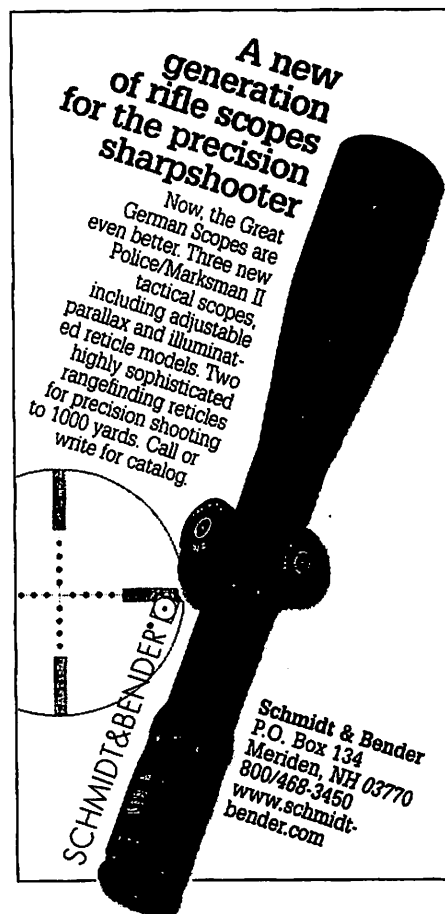
Sports psychology became interested in perception and attention in the 1970's. Anyone who has watched two outfielders collide as they both went for a fly ball has seen the effect of perceptual tunneling and can understand why it might be important to manage it in the athletic arena. Even Tiger Woods has commented on how a failure to control his concentration had resulted in his losing in the clutch. Athletes have continually reported not hearing the noise of the crowd. Every sports psychology book published since 1975 has addressed the issue of the "funnel of concentration" and in particular perceptual "tunneling and blockage." Sports psychology also began to develop ways to funnel the emotional responses in a stressful activity into something more productive - such as a focused, emotionally intense state.

In law enforcement, these concepts began to surface in regard to shooting situations. Officers who had combat experience began to find the phenomenon that occurs on the battlefield also occurs in the civilian world in life threatening situations. Police Psychologists like Dr. Roger Solomon and Dr. Kevin Gilmartin began to note that officers involved in shootings and other high-stress events had increased emotional reactions after these events. They experienced unusual perceptual reactions or their body, mind and memory worked in unusual ways - confusing and frightening them. These events began to be called things like tunnel vision and tunnel hearing.

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almost every law enforcement seminar pertaining to shooting decisions or post shooting trauma, has included perceptual tunneling and blockage.

Today's Understanding

Tunnel vision and tunnel hearing are common terms in law enforcement today. We now know that they relate to a variety of changes in both the brain and the sensory systems when a human or animal experiences a threatening or stressful situation. However there is still much misunderstanding about how humans perform in highly stressful events and the effects of these phenomena on law enforcement officers.

A study conducted by Drs. Honig and Roland of the Los Angeles County Sheriff's Department, and published in the October 1998 edition of *The Police Chief* indicated that 90% of the officers involved in 348 shootings experienced some type of perceptual disturbance. Besides vision and hearing distortions, this study also measured distortions in memory and time. Their results were as follows:

Sounds were quieter	(51%)
Sounds were louder	(23%)
Experienced tunnel vision	(45%)
Noticed increased attention to detail	(41%)
Memory loss for part of the incident	(22%)
Time sped up	(20%)
Time slowed down	(41%)

Note: the items studied involved more than just a change in hearing and seeing. They also involved changes in attention to detail and memory loss for part of the incident. These are linked to the sensation of vision, but have more to do with changes in the brain. Also studied was the awareness of changes in time involving a speeding up or a slowing down, both of which are related to brain and nerve changes under stress.

Dr. Alexis Artwohl, author of *Surviving Deadly Force Encounters*, is doing a more extensive and ongoing study of changes that occur because of high stress

or deadly force encounters in law enforcement. Her study, although not involving as many officers as the LASO study, is much more detailed. Besides changes in hearing and vision, Dr. Artwohl focuses on changes in thinking, awareness, memory and performance under stress. She obtained the following results:

Fast motion time	(17%)
Slow motion time	(62%)
Diminished sound	(84%)
Intensified sound	(17%)
Tunnel vision	(79%)
Heightened visual clarity	(71%)
Memory loss for part of the event	(52%)
Memory loss for some of your action	(46%)
Memory distortion	(21%)
Automatic pilot	(74%)
Dissociation	(39%)
Intrusive Distracting Thoughts	(26%)
Temporary Paralysis	(07%)

In Dr. Artwohl's study a large part of the reactions have to do with thinking, awareness and memory, which have more to do with how the brain is operating under stress than it does with just the eye and ear. Remember, the eye, ear and other senses do not have a will of their own, but operate at the direction of both the conscious and unconscious mind – a blink to an object coming at the eye is an instinctive reaction of the unconscious mind, while a directed weapon stare is a reaction of the conscious mind.

Even in non-stress situations, when something catches our attention we begin to have "selective attention." We focus on the object of our attention to the exclusion of other things. This process involves two steps. First we become "oriented" toward the event – meaning that we shift our attention toward it and then we "focus" on it or funnel our concentration in on it – again to the exclusion of other things in the sensory environment.

As we shift our attention toward something, the mind will direct the senses to give it the information it needs in the speed that it needs it. If whatever we are focusing on begins to create an emotional response, such as fear, a whole cascade of responses happen that amplify the sense, thought and behavioral processes."

An Illustration – Vision

According to Dr. Paul Michels, an optometrist who specializes in visual perception under low light, the eye, in its normal operating mode, sees clearly only that which is directly in front of our focus – anything that is more than five degrees off center becomes very difficult to see, until it gets so removed from our central focus that it fades from our peripheral vision. If you want to check this out, hold this page up in front of you. While continuing to look straight ahead, (where the page was) move the page away from your central focus. As you move the page beyond the five-degree range you will notice that the writing becomes just lines. You won't have to move it far before the lines are not even recognizable as writing. This is important! Even though you can't tell that the lines are writing, you still know it is writing. There are many reasons for this including contextual clues, such as knowing that it looks like lines on a page.

Let's take this example to a street encounter, you're in a face-to-face shooting situation in the street. You have your weapon drawn, front sight on the subject, locked eye-to-eye with him. You are ordering the subject (who has his hands on his waist) to raise his hands. Even if you were not under stress, if you maintain eye-to-eye focus and the subject is close enough that the waist was beyond the five degrees of central focus, you would not be able to tell what, if anything, was in his hands. However, you would have no hesitation in discharging your weapon if the subject rapidly moved his hand from his waist and thrust it toward you as if drawing a pistol. This motion is the contextual clue that leads you to conclude that what you could not see for certain was actually a weapon and you're going to be shot at. You would have the same certainty that you were going to be shot as you would have about the lines on the page being writing. This is because of our habit and *confidence in* using contextual clues.

In this particular illustration, contextual

clues are the only clues that the officer can rely on, even if he changes from an eye-to eye focus to an eye-to-weapon focus by looking directly at the waistband. In a study I did that was published in *The Police Marksman*, (November/December, 2000) I had subjects draw and fire a gun from the waistband area. The fastest time for a self-initiated draw to a combat tuck position or a draw to arm extension position both resulted in the weapon being drawn and fired in 9/100's of a second. The full motion was caught in three frames of a digital video camera. The eyes of an officer looking directly at the weapon as it rapidly moved to firing position would not be able to discriminate whether the weapon was a revolver, semi-automatic, cap gun or nothing but a pointed finger. If the officer waited until the weapon had reached its peak of motion and stopped so his eyes could see that it really was a handgun, at least two rounds could be fired at him before he could even complete the action of pulling of his trigger. This would happen even if he were set to fire, had his finger on the trigger and had already made the decision to shoot if threatened.

The movement in this illustration would have been detected by the peripheral vision, which lacks the ability to determine color at night and also to do fine discrimination – such as distinguishing a revolver from a semi-automatic even in daylight. The peripheral vision is also narrowed during periods of high and low stress. Dr. Jean Williams, from the University of Arizona found an approximately 20% loss of peripheral vision on either side, created just by the stress of having subjects do two visual things at the same time.

The eye undergoes three changes under high stress. The pupils dilate, the lens flattens and the eyes begin to move in a "saccadic" fashion. The general theory as to why the lens flatten and the pupils dilate suggests that this helps us see better in low light and at a reasonable distance. This would be important to a species which survived in a world where they were hunted by predators at dawn and dusk.

The saccadic movement of the eye is a rapid, jerky, irregular scanning motion. Apparently, under stress, the eye makes this movement because it allows it to pick up more visual clues at a time when conscious interaction between the brain and the eye might be too slow. Because

saccadic movement is so rapid and jerky, the brain does not process what the eye reports during this movement – the brain only processes what the eye stops on. The saccadic movement takes about 5/100's of a second for each motion. This means the vision is stuttering and the officer will be seeing things in glimpses.

The Mind – Funnel of Concentration

Now that we have some idea about the complexity of vision, let's remember the original point – the sense receptor, regardless of which one it is or how it functions, is operating to serve the mind and give the mind the information it needs to help the person survive. To do this let's again look at the results of the studies presented in the beginning of this article.

... in a life and death encounter, officers who are not focusing on their weapon might not even be able to tell whether or not the weapon was fired.

Factors in Dr. Artwohl's study that are related to a "funneled concentration" on a threat would be an intensified sound, tunnel vision, and heightened visual clarity. These would generally result because the officer is focused on what, to him, is the threatening aspect of the incident. The officer's mind is directing the sense organs to get as much information as quickly as possible, from something he sees as threatening. As the officer's mind focuses on what is perceived to be a threat he gains volumes of information about what he's focusing on. But, because he is doing this, the officer pays a very high price. The price of focusing on something specific is the loss of a lot of other information that may later prove valuable to the officer. What he is not focused on is suppressed by the sensory systems and the brain. Because of this, the things that he is not focusing on could literally disappear from his aware-

ness. For instance, in a life and death encounter, officers who are not focusing on their weapon might not even be able to tell whether or not the weapon was fired. In Dr. Artwohl's study, factors that show inattention to what is (at the time) thought to be less relevant are diminished sound, memory loss for part of the event and memory loss for some of your action. This is the price the officer pays for having a funnel of concentration – some things just get lost because at the time, other things are more important.

To illustrate this, focus on the sensations coming from the soles of your feet. Because you have funneled your concentration on this article, your mind made a decision to ignore the sensations coming from the bottom of your feet. You cannot remember what your feet reported to you, even two minutes ago. Yet they are your own feet. Can you imagine the withering cross-examination you would undergo from an attorney who could not believe that you didn't know what your own feet felt like? If you can understand this, you can understand what an officer feels like when he can't remember what he did or what happened in what is probably one of the most traumatizing and significant events of his life.

Therefore, a funnel of concentration, ordered by the mind and obeyed by the senses, results in among other things, both perceptual tunneling and perceptual blockage, as well as the resulting memory problems. Perceptual tunneling is a term that relates to a narrowing of the perceptual field so a viewer is seeing or hearing only a fragment of the whole perceptual field. But what he is focused on is very clearly perceived and may (as a consequence of this and his emotional response) be locked clearly in his memory forever. The term blockage relates to the concept that if a person does not hear or see something because he was not focused or aware of it, it may be blocked from entering his conscious mind and memory. These problems are normal problems of human attention and perception. They become more focused and unusual under high stress.

The Mind – Dissociation

Dr. Artwohl's research illustrated that 39% of officers involved in deadly force encounters experienced dissociation. She defines this as the officer having moments when he had a strange sense of detachment, as if the event were a dream

or like he was looking at himself from the outside. Most psychologists who work with officers involved in trauma find dissociation in some portion of the officers. Dr. Artwohl has finally put a percentage to it for us.

Dissociation is also generally recognized as the emotional recoil to a traumatizing event. It is seen as a psychological defense mechanism. The person is emotionally shutting down so he does not breakdown under what he's afraid could be overwhelming trauma – like coming face to face with his own death. In a more intense format, it involves a temporary paralysis (which Dr. Artwohl found in 7% of the officers studied.) This occurs particularly in officers who suddenly and dramatically encounter a significantly traumatizing event, and in terms of the awareness spectrum move from condition white to condition black – panic and paralysis. If the event lasts long enough, most of these officers recover from their paralysis and react appropriately to the threat.

Dissociation is not all bad. With a well-trained officer, a particular form of it can be good. It's good when (in the short term) an officer shuts down and is then able to do what he needs to survive or cope with the trauma.

The purpose of good training is to build an officer's decision making and reaction skills so he can focus on positive, legal and ethical decision-making and effective use of survival skills. To do this, the officer has to be trained well enough to dissociate enough from the threat, that his well-trained skills can be effectively employed. For instance, a golfer can never make a great swing if (while swinging) he is simultaneously worried about his bank account. Likewise, an officer who is focused on losing his life cannot (simultaneously and effectively) be focused on making his weapon work effectively.

Dr. Landers, from Arizona State University, simultaneously recorded the brain waves of Olympic shooters and the accuracy of their shots. He said he was able to predict the accuracy of the shot, not by looking at the target, but by looking at the read out of their brain waves. The more the shooter was detached, (dissociated) so nothing interfered with their focused, relaxed state of mind, the more accurate the shot was. The more distracted the shooter was, either with thoughts or feelings, the worse the shot was. The

message from his research is clear – if the officer cannot dissociate or remove his conscious mind from the presence of the lethal threat, his trained, tactical skills can suffer significantly. I have interviewed officers who have fired six rounds in defense of their life at a subject standing six feet away. They missed with all six rounds – they were lucky to have survived. Their inability to dissociate or distance their mind from the threat prevented them from focusing on the skills they needed to survive.

Officers may experience a range of dissociative responses. On one end he withdraws into panic and/or paralysis, hopefully to recover and cope with the situation. In the middle, he withdraws or shuts down to survive emotionally through the crisis. He does what he needs to do to be effective and hopefully he successfully copes after it's all over. On the other end is the officer who dissociates, shifts into the zone, makes great decisions and performs awesomely and instinctively, even in the face of his own death. Incidentally, an officer who is emotionally withdrawn, but intently, tactically engaged may experience the same phenomenon – the out of body experience – that is occasionally reported by athletes who are similarly, psychologically engaged. In this circumstance, the participant has a transitory sense of being so detached that he seems to be watching himself do what he's doing from outside his body.

Memory

It should have become increasingly clear that a characteristic of performance in a lethal force situation is going to be memory problems. In Dr. Artwohl's study, she found 52% of officers had a memory loss for parts of the event; 46% even had a memory loss for some of their actions; 21% had memory distortions in what they saw, heard or experienced during the event. Contaminating their performance and memory, are the intrusive, distracting thoughts that 26% of the officers had in the midst of a deadly force encounter. Even in the midst of doing what they needed to do to survive, officers found they were distracted. In itself this is not unusual and is the equivalent of "seeing your life flash before your eyes." I have found three kinds of memory problems to occur in lethal force encounters.

This final memory problem exempli-

1 An officer cannot remember and report what he does not perceive. There are a lot of details in a lethal force encounter that (for a variety of reasons) do not get an officer's full attention and subsequently will never get remembered. The complications could occur from the crisis mode of the senses to the funnel of concentration of a mind in distress. Even an officer who is in the zone, for instance, might not even remember when or how he drew his weapon. If he dissociated enough so he went into panic or paralysis, his focus would be inward to his own reactions. Therefore, he would be incapable of telling anyone what was going on outside his own mind. An officer, who is intently focused on the subject's gun, might not even hear his own weapon discharge. Regardless of the reason, what is not perceived is not remembered.

2 An officer may experience something so difficult to deal with that he unconsciously represses it and is literally incapable of even remembering that he knows it – or he might also consciously suppress it. In other words, it is so difficult to deal with what he experienced that he refuses to remember it. Several years ago I interviewed an officer who accidentally shot and killed his own partner. The partner died in his arms within seconds from a severed aorta. The surviving officer just could not talk about certain parts of the event. He was afraid that even facing those in his memory would create so much pain that he would go crazy.

3 The third kind of memory problem is actually the reverse of the above. In this problem the officer creates memories that he then believes to be real. These are usually out of logic, but sometimes out of perceptual distortions. For instance, the officer who cannot remember part of his own behavior or part of the incident will fill in the blanks with what seems reasonable. The more he thinks about the event or retells it, the more he believes it happened, sometimes even in spite of physical evidence to the contrary. This appears to happen less with officers who do a walk through shortly after the incident and before they make a formal statement. A couple of years ago I interviewed an extremely credible officer who swore he was locked eye-to-eye with an armed subject he had fired three rounds at in self defense. The autopsy revealed the subject was shot in the side and the back and the shooting could not have happened as the officer remembered it. Fortunately for the defense, the jury believed the results of my study on subject movement and officer reaction in shooting situations, as well as my explanation as to why the officer believed he had seen something that could not have happened.

fies another interesting aspect of lethal force encounters. The only way we can face this kind of threat is if we believe that we can control or manage the threat, at some level. We need to have the power to control the unknown. For an officer who cannot remember what happened, that control is not possible. For some of those officers, unconsciously, it is better to create a fictional fact about what might have happened than to live with the unknown.

Is Stress in Your Mind or Body?

In this article, the emotional condition of the officer and its impact on his perceptions and thinking was emphasized. When I am referring to stress here I am referring to psychological distress. In other words, even if your pulse is up, you may not necessarily be experiencing psychological distress or even a loss of fine motor skills. Biathlon competitors routinely fire their weapons with a pulse of 180 beats a minute. I have sprinted hills and gotten my pulse up to over 200 beats a minute, yet had no trouble working the small buttons on my wrist/stop watch. I also did not have a funnel of concentration, auditory distortions, etc. But, inversely, it is not unusual for me to drop my car keys or fumble with a lock in an urgency to get inside a door in a rush, with no correlate increase in pulse. So, for the purposes of the article, the distress referred to is psychological.

Conclusion

I have interviewed, advised or counseled over 700 officers who have been in lethal force encounters. If you have learned anything from this article, it is because those officers who have been there have taught me all about it. One final lesson that they, and my over 50 years of athletic competition have taught me – the more someone understands, uses, and even exploits these adaptive stress reactions, the more successful they will be. ☆

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, Minnesota. He is an ex-lecturer and contributing expert to the Street Survival Seminars and the Tactical Edge.