



The Physiology Of Violence

Proper Preparation Prevents Poor
Performance

By Richard Kay

Stress is a major factor in determining performance in violent confrontations. Understanding how the body and mind function under stress is critical for correct preparation to survive and thrive in the toxic environment that is violence.

This article examines the relationship between the human nervous system and the stress response, and the effects of heart rate on operational performance. It examines training concepts designed to properly prepare officers for the stress of use-of-force confrontations, and offers techniques for effectively managing physiological arousal.

Structure Of The Human Nervous System

The human nervous system is comprised of the peripheral and central nervous systems.

The peripheral nervous system is divided into the somatic nervous system, which comprises those functions people have conscious control over (such as muscle movement), and the autonomic nervous system, which comprises those functions that are automatically regulated (such as heart beat). The autonomic nervous system has two further divisions – the parasympathetic nervous system, which is responsible for calming the body, and the sympathetic nervous system, which is responsible for arousing the body. It is the sympathetic nervous system that is responsible for the effects of stress.

The central nervous system is comprised of the brain and spinal cord. The brain has three key areas:

- Forebrain – the ‘human’ brain, it performs basic thought processes and is responsible for rational and logic thought; resistant to trauma
- Midbrain – the ‘primitive’ brain, it is the part that all mammals have in common and

performs extensive reflexive processes; sensitive to trauma

- Hindbrain – the lower part of the brainstem that regulates heart rate and respiration; sensitive to trauma

Under stress it is the midbrain that dominates, and is largely responsible for the stress response. The midbrain has no philosophy, no hesitation and no regret. It knows only death and life, and nothing in between. Think of the midbrain functions as the four Fs – fight, flee, feed and... procreate. The midbrain is never confused and never dithers. Its job is to enable survival. It is poor at multitasking. It acts decisively and only does one thing at a time.

Unfortunately, the midbrain is ignored in many training philosophies, with too much training ‘in the abstract’, which is where all training must begin, because the forebrain is the entry point for all information. When people learn, information is processed in the forebrain. Unfortunately, that is where most training also ends. As the student is gradually immersed in the training environment, stress levels must be increased so that important psychomotor skills begin to filter into the midbrain.

The idea of stress inoculation is to transfer training from the ‘thinking’ forebrain to the ‘reflexive’ midbrain, thus improving reflexive responses and making them more natural under stress. The midbrain will only ‘know what to do’ if the student has been stress inoculated.

Fear, Physiology And Performance

When people are going about their day unfocused and unprepared for anything bad to happen, they are at their lowest level of readiness (condition white), a place where they are vulnerable. The next level is that of basic alertness and readiness, where they are psychologically prepared (condition yellow).

There is no specific heart rate associated with condition white and condition yellow; the difference is more psychological than physiological.

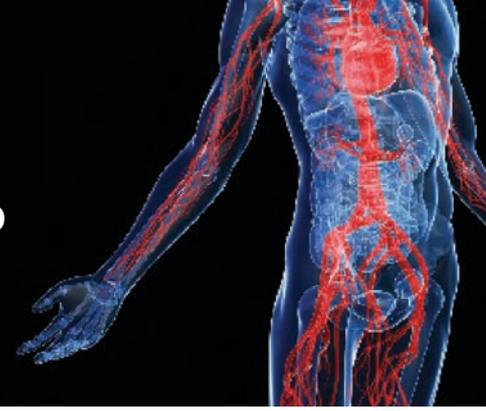
However, as the level of arousal increases, the condition levels can be associated with specific heart rate levels. There is a zone that exists, generally between 115 and 145 bpm (beats per minute), where people are at their optimal survival and combat performance level (condition red). Their complex motor skills, visual reaction time and cognitive reaction time are all at their peak, but they begin to pay a price. Starting at about 115 bpm, their fine-motor skills begin to deteriorate.

The impact of these conditions can vary greatly depending upon physical fitness and other factors. Also, it must be understood that these heart rates apply only to survival stress or fear-induced heart rate increases. A person can do a set of wind sprints and get his heart rate to 200 bpm, but the effect of this exercise-induced heart rate increase will not be the same as when fear or survival stress causes the increase. Furthermore, when the vasoconstriction of fear-induced heart rate increase is combined with physical exertion or exercise demands, the result seems to be an amplifying effect, which can result in some extraordinarily high heart rates. So the physiological factors are poor indicators of combat performance, since so much depends upon individual characteristics. However, everyone has a condition yellow, red and black, and it is important to understand how physiological arousal can interact with combat performance.

Research has found that when the average officer experiences a stress-induced heart rate increase in the area of 145 bpm, there is a significant breakdown in performance. But this is not true for everyone. Apparently, if an officer has practiced the required skills



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extensively, he can ‘push the envelope’ of condition red, enabling extraordinary performance at accelerated heart rate levels (condition grey), roughly between 145 and 175 bpm.

For most officers, 145 bpm represents a level at which performance begins to break down, but for some this is the optimal level of arousal. They have rehearsed and trained to push the envelope, turning each action into an autopilot response and permitting themselves to function at an expert level in condition grey.

This process is called stress acclimatisation. The fundamental concept is that prior success under stressful conditions acclimatises the officer to similar situations and promotes future success. With the proper training and requisite conditioning and practice, skills that others think impossible can be achieved. Stress acclimatisation is about measuring precise doses of stress followed by waves of recovery and then repeating these cycles very specifically. There must be time for adaptation to take place and there must be enough training, repeated over time, to help it stick, as well as reinforcing the conditioning.

Emotions have at least three components – cognitive, physiological and behavioural. An important part of what is achieved through stress inoculation is cognitive. The officer’s experience in training helps to take some of the surprise out of it when the real situation arises. Effective training also elevates the sense of confidence, which is another cognitive aspect of stress inoculation. The sense of personal effectiveness and self-confidence created by realistic training is as much a stress reducer as when the muscles go on autopilot. There is evidence to indicate that experts in top physical condition, under specific, controlled situations, can use autopilot and stress inoculation to push the envelope of condition red high into the grey zone. A simple set of skills, combined with an emphasis on actions requiring complex and gross motor muscle operations (as opposed to fine-motor control), all extensively

rehearsed, allows for extraordinary performance levels under stress.

Research indicates that 175 bpm is about as high as condition red can be pushed into this mysterious grey zone. Cardiologists tell us that, at a certain point, an increased heart rate becomes counterproductive because the heart is pumping so fast that it cannot draw in a full load of blood before pumping it back out. As the heart rate increases beyond this point, the effectiveness of the heart, and the level of oxygen provided to the brain, steadily decreases. Cardiologists suggest that this might be what is happening when SNS (sympathetic nervous system) arousal induces a heart rate above 175 bpm.

Whatever the cause, something remarkable appears to be happening when the SNS accelerates the heart rate above 175 bpm. This is condition black. As an officer enters into condition black, cognitive processing deteriorates, which is a fancy way of saying that he stops thinking. In condition black, an officer can run and fight like a big, hairless, clawless bear, but that is about all he is capable of doing. His forebrain shuts down and the midbrain reaches up and ‘hijacks’ it.

There is a tremendous difference between the performance impact of heart rate increase from fear (that is, SNS flooding stress hormones into the body), and heart rate increase from physical exercise. When a person’s heart is pounding due to physical exertion, his face will usually be beet red, as every vessel dilates wide open to get blood to the muscles. But with a fear-induced heart rate increase, his face will usually turn white, due to vasoconstriction. If there are extreme physical demands placed upon the body at the same time that the vasoconstriction is occurring, then these two processes apparently work against each other to cause a skyrocketing heart rate. The current theory of why is that the physical demands cause the body to scream for oxygen while the vasoconstriction shuts down the blood flow that provides the oxygen, causing the heart to beat ever faster while achieving very little.

Autopilot responses developed through repetitive practice, and stress inoculation through realistic, appropriate training, are two powerful and effective tools to push the envelope and stay in the zone. One additional tool to control physiological response is autogenic breathing.

Autogenic breathing (also known as tactical or square breathing) is an easy technique that can be used in a stressful situation to control the sympathetic nervous system. The more it is practised, the quicker the effects kick in. It can be used before, during and after a violent situation. When used before, it quickly calms and prepares officers to function at their best in a hostile environment. After a critical incident, it is a highly effective tool to help delink the physiological arousal from the memory of the event. Once officers start using it, they should keep tuning it until they get to the level that works for them.

The process of autogenic breathing is as follows:

- Breathe in through the nose (four count)
- Natural pause (four count)
- Breathe out through the mouth (four count)
- Natural pause (four count)
- Repeat three to four times

Officers do not rise to the occasion in violent confrontations; they sink to the level of their training. Whatever is drilled in training comes out the other end in operations – no more, no less. There must be a continual effort to develop realistic simulation training so that officers develop skill sets that transfer to reality. Public safety starts with officer safety. ■

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