THE FIGHT OR FLIGHT RESPONSE: UNDERSTANDING AND IDENTIFYING *STRESS INDICATORS*

If you have ever had a job interview, given an important speech or been talked into doing a bungee jump, the chances are you will have experienced the physiological reactions to acute stress. You may have noticed your heart racing, your breathing increase, your palms become sweaty and, in severe and prolonged cases, you may have found yourself rushing to the bathroom. You will also have noticed that these physical symptoms are involuntary, instinctive, and, most crucially for those in the security industry, almost impossible to supress. But what exactly causes these responses, and why is it important to be able to recognise them? Alexandra James explains.

The 'fight or flight response' was a term first coined in 1915 by Dr. Walter B. Cannon, and is also known as the 'acute stress response' or 'hyperarousal'. It is an in-built self-preservation mechanism that is made up of a series of neuro, chemical, and hormonal processes that prepare our bodies to effectively respond to threats in one of two ways: by fighting or by fleeing. More recently, the term was expanded to 'fight, flight or freeze', but we'll talk about the freeze response a bit later.

In order to understand the fight or flight response, we first need to cover a little bit of basic human anatomy; namely, the limbic system and the sympathetic nervous system. The limbic system is the body's very primitive but highly effective threat alert system. It is made up of a number of structures located in the brain, including the amygdala, the hypothalamus and the pituitary gland. It is responsible for a variety of emotions and behavioural impulses that are related to survival, such as pleasure while eating and during sex, and also fear and stress in dangerous situations. It also plays a significant role in fear conditioning and how memories are stored.

The fight or flight response begins in the limbic system, specifically in the amygdala. The amygdala is the part of the brain that interprets sensory data, and sounds the initial alarm. From birth, our limbic systems are hardwired to react to certain threatening stimuli, such as loud noises and sudden movements. However, as we grow up, our individual lists of triggers increase as we each experience various dangerous or stressful situations. If the amygdala perceives something in our environment that matches up with its list of known threats then it overrides the conscious, rational brain and sends 'high alert' neuro impulses to the hypothalamus and pituitary gland. Upon receiving the alert from the amygdala, the pituitary gland releases messenger hormones into the bloodstream, and the hypothalamus sends nerve impulses down the spinal cord. Both the hormonal and neuro messages end up in the same place: the adrenal glands. This is where the handover from the limbic system to the autonomic nervous system (ANS) occurs.

The ANS is the part of the nervous system responsible for unconscious processes such as breathing, heart rate and digestion. It is split into two parts: the parasympathetic division and the sympathetic division. The parasympathetic division is responsible for relaxation responses, such as sleep and recovery after exercise or trauma, while the sympathetic division is responsible for activating processes that help the body to react to stress, i.e. the fight or flight response.

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The adrenal glands, which sit atop the kidneys, take over the signalling cascade from the limbic system. The hormonal and neuro messages sent by the limbic system triggers the release of epinephrine (adrenaline) and norepinephrine (noradrenaline) into the bloodstream, which in turn trigger a series of responses from organs and muscles throughout the body.

STRESS INDICATORS

Identifying the physiological symptoms of the fight or flight response can be incredibly difficult, particularly in a busy, noisy environment such as an airport, however, the signs will be there if you know what to look for. Here is a brief summary of stress reactions triggered by the sympathetic nervous system, and their functions:

- **Accelerated heart rate and blood pressure**
  A faster pulse is often difficult to perceive, but in some cases you may actually be able to see veins throbbing in the neck or temple.

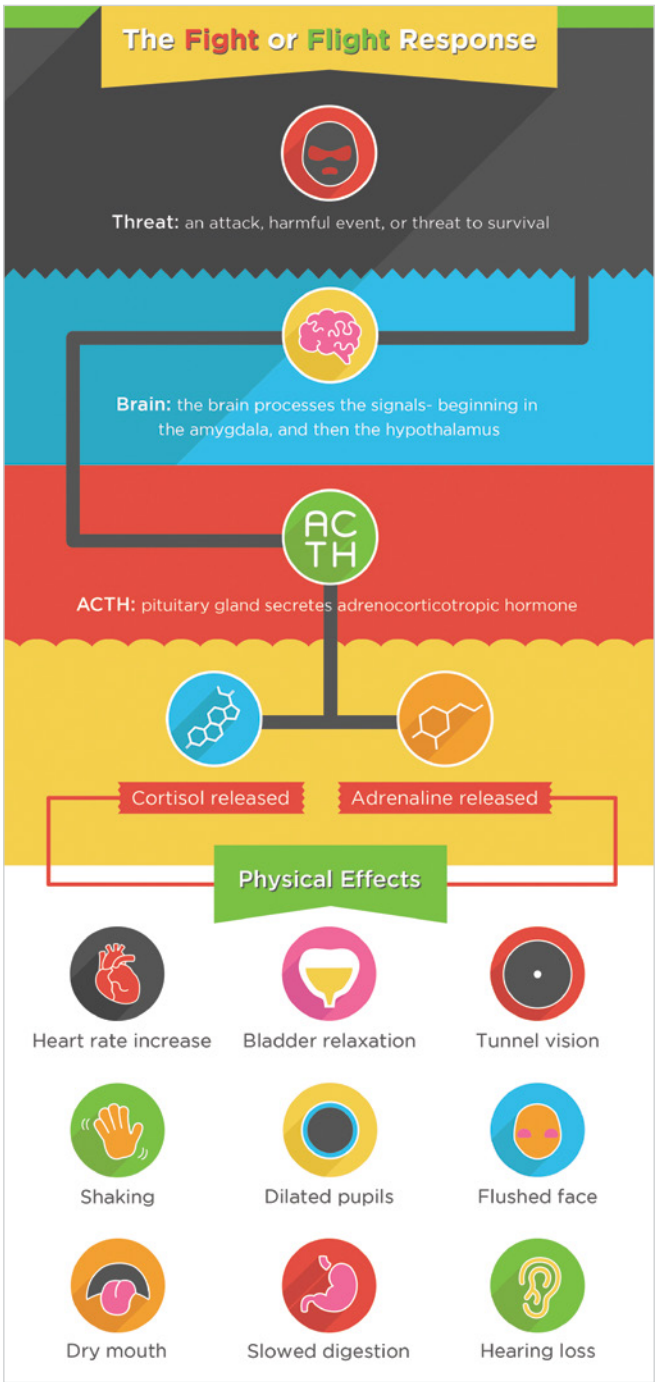
- **Increased lung capacity**
  An acutely stressed person will take deeper and more rapid breaths.

- **Increased blood flow to muscles**
  Greater blood flow and deeper breaths means more oxygen being delivered to our muscles, preparing our bodies to run from, or to fight, the threat. Tensed muscles can affect a person's gait, facial expression and hand gestures. An acutely stressed person may clench their fists in preparation to punch (fight).

- **Quivering jaw and grinding teeth**
  The tension may be noticed in the jaw, where the body is sub-consciously preparing itself to bite as both an offensive and defensive action. Sports professionals, being highly trained and competitive athletes, have sometimes found themselves incapable of exercising restraint in the height of 'battle'; footballer Luis Suárez and boxer Mike Tyson are both famous examples of individuals whose natural reactions to stress led them to bite their opponents.

- **Blood flow diverted away from the skin's surface**
  Those experiencing intense fear often become pale and feel cold as blood is diverted away from the skin. As well as diverting blood to organs and processes that aid in our escape, this reaction is also thought to assist survival during an attack by preventing us from losing too much blood.

- **Activated sweat glands**
  Perhaps the most obvious indicator of stress is the production of sweat. This aids body cooling and, albeit only minimally, lightens the body to facilitate escape. It is also thought that this response is a subconscious defensive process as our skin becomes slippery and difficult to grab.



- **Dilated pupils**
  This is a difficult reaction to see unless you are very close to the individual and making eye contact. When our pupils dilate, they allow greater amounts of light into our eyes, enhancing our vision and thereby aiding our ability to perceive the threat and to assess our escape routes. This intense focusing of the eyes on a threat can sometimes lead to what we call 'tunnel vision' as our peripheral vision becomes distorted.

- **Reduced digestive functions**
  In times of intense stress, the body inhibits any processes that are not absolutely critical in order to divert resources to muscles and processes that will aid our escape. If you are a nervous public speaker,

you may have noticed your mouth become dry in the middle of giving a speech. This is because the salivary glands, as well as the rest of the digestive system, shut down, sometimes leading to constipation.

- **Release of energy stores**
  The release of adrenaline and an increase in blood sugar and blood pressure means the body now has access to higher than normal amounts of energy and strength. In certain situations, this can often lead to restlessness and fidgeting. The individual may also have trouble modulating their vocal tone and hand gestures. It is worth noting that while strength output is increased, the ability to perform fine motor skills, such as writing and picking up small objects, is often reduced.

- **Inhibited bladder and excretory functions**
  Particularly over a prolonged period of stress, the individual may need to use the bathroom more frequently than normal. In extreme circumstances, they may totally lose control of their bowels and bladder. This is the body's way of shedding any extra weight that may slow it down if it needs to fight or run from the source of stress. In the US, and other countries where capital punishment is still legal, the condemned are given adult nappies (diapers) in order to deal with this natural bodily reaction to fear prior to their execution.

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- **Piloerection (goosebumps)**
  Goosebumps (or 'goose flesh' or 'chicken skin') increase the surface area of the skin in order to modulate temperature during hyperarousal. In other animals, the same reaction causes fur to stand on end, making the individual look larger and more intimidating to its enemies.

The autonomic nervous system has one last tactic up its sleeve. While the sympathetic division drives the fight or flight response, the parasympathetic division (responsible for relaxation and recovery) prompts what is known as the 'freeze response' in situations that are perceived to be simply too much for us to handle. It is thought that the freeze response evolved for a number of reasons; namely, to avoid detection or to seem unattractive to hungry predators by 'playing dead'.

The reaction is characterised by paralysis (like a deer in headlights) and a numbing sensation – a kind of natural analgesic. Survivors of sexual, terrorist and other types of attacks have often reported having 'out-of-body' experiences, in which they claim to have witnessed the attack occurring from a different perspective. They reported either a reduction in, or total lack of, physical sensation, their bodies becoming limp and, in some cases, no – or limited – recollection of the attack, despite remaining conscious for the duration. Essentially, the mind attempts to disassociate itself from the body in times of extreme distress.

THE FREEZE RESPONSE

As we have discussed, the fight or flight mechanism is activated when we feel threatened. However, it is only triggered when we believe we are capable of emerging from the situation, either by fighting or by fleeing, i.e. when we believe there is a possibility of survival – when there is hope. So what happens when we are faced with a threat that we believe is too strong for us to fight, or too fast for us to flee from, i.e. when the situation is hopeless?

US physiologist Walter Bradford Cannon

IS IT POSSIBLE TO SUPPRESS THE FIGHT OR FLIGHT RESPONSE?

In many ways, we humans have come a long way; we have developed incredible technology that allows us to transcend our natural abilities, to cure previously deadly diseases, to allow us to survive in inhospitable terrain, and to allow us to travel in ways our ancestors could not even have dreamed of. However, our instincts and the ways in which our bodies work have evolved comparatively little since our hunter/gatherer days. While there is no doubt that the fight or flight response would have been incredibly handy to our ancestors as they came up against falling boulders and sabre-toothed tigers, in our modern world there are very few situations in which we are required to actually fight or flee. In fact, these days, the fight or flight response tends to get in our way more than it actually helps.

The US DARPA programme, the Pentagon's research division, has spent hundreds of thousands of dollars on research to better understand the fight or flight response, and to explore ways to suppress it in order to improve soldiers' logic and decision-making abilities during combat. The concept of 'stress inoculation training' is employed by militaries all over the world, and it is widely accepted that regular exposure to perceived dangerous situations desensitises an individual to stress, decreasing the activity of the autonomic nervous system during stressful episodes and increasing the role of the somatic nervous system, which is responsible for voluntary movement.

On the other side of the coin, terrorist organisations are known to recruit based on an individual's natural ability to suppress physical expressions of fear and guilt. However, some researchers have suggested that the fight or flight response, specifically the rush of endorphins experienced after emerging safely from a fight or flight situation, may be responsible for attracting some individuals, particularly survivalist terrorists, to carry out violent acts.

So, is it possible to suppress the fight or flight response? The simple answer is, 'no'. Despite the research and technology that has been invested in to understand the response, it has not been possible to totally eliminate it. Intense training and medication may well dampen the effects of fear and stress, but they will not remove it altogether. Crucially, even if an individual, for example, a terrorist, is aware of traditional behavioural indicators of stress, their attempts to suppress them continue to be identifiable. The simple fact is that the fight or flight response is a fundamental element of our biological mechanics, and part of what makes us human.

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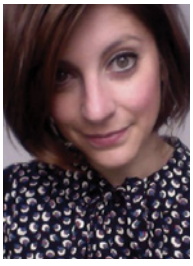

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