

STRESS AND HUMAN FUNCTIONING¹

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Stress Influences Behaviour

Probably everyone has his own experience of stress and how stress influences behaviour. Stress can be an extremely strong affect, or just a mild sensation, but when stressed we become uneasy. It is, in other words, an unpleasant state to be in and being stressed is by definition not positive.

Stress is a psychological reaction because people are stressed by what they experience and by their appraisal of that experience. The environment and our perception of it affect us psychologically and certain things trigger off a stress reaction. When, for example, we experience a situation as threatening, we become stressed, while we are normally not stressed by everyday and harmless situations. Stress reactions are automatic, immediate and beyond the reach of our conscious will. When stressed, we can not deliberately make the feeling end, even if we try to.

Things in the environment with the potential for triggering stress reactions are called *stressors*. Stressors can be general and affect most people. Some events stress us all. Probably all of us would be stressed standing eye to eye with a tiger, or if while driving a car we should meet another car driving on the wrong side of a motorway. Stressors are also individual. Some people are not stressed by making a presentation before a large group of people, while others experience paralysing stress. Many people experience varying degrees of stress before an examination; some are always in a state of stress, irrespective of their level of preparation, others never seem to experience stress on such occasions.

Although stress is a psychological reaction, it strongly affects us physiologically as well. The heart rate, blood pressure, hormone secretion, digestive system, breathing, muscular tension and bodily movements, to name just a few functions, are all affected by stress. Stress seems to affect the totality of our biological system; almost nothing physiological stays normal when we are in a state of stress.

¹ This article is an edited summary of chapters 12 and 13 from the book: "Human Error in the Maritime Industry" (Schager, B., 2008). The book can be ordered from: www.breakwater.se

The literature on stress is quite extensive and the concept of stress has many connotations and approaches. Stress can be lifelong, a sort of creeping current just beneath the surface of some individuals, as if life itself was a stressor. Such stress can over time lead to psychosomatic disorders, to drinking and drug problems as well as to other psychological difficulties. A great number of people live in such a state of stress which will eventually affect their health. Needless to say, people who are habitually suffering from such stress may easily be overwhelmed and unable to function in situations when a change in the environment imposes even further stress upon them.

Stress is believed to be a primitive reaction to danger – a reaction that in ancient times served us well and prepared us for a fight-or-flight reaction to the perils of that time. In a modern and technologically as well as a socially advanced world, such stress reactions might still serve us well, when facing an immediate clear-cut personal threat to our lives, but those threats are not so common today. Instead we seem to be equipped with an out-of-date, pre-defined set-up of mental and physiological responses to meet complicated situations of a modern kind. The effect of this in a nuanced and advanced surrounding is that stress now hampers our capacities at times when we need them the most.

Effects of Stress

Stress levels can vary, and with increased stress the severity of manifestations will increase. The degree of stress is not directly coupled with stressors in the environment. Instead, it depends on how an individual perceives a stressor, how an individual understands the pressure and demands from the outside world, and what an individual is psychologically capable of. In this respect it is reasonable to talk about individual variations in psychological vulnerability or psychological robustness. Ample research has made it increasingly clear (Lazarus, 1999) that reactions to stress cannot be predicted without reference to personality traits and to individual differences. Two people may therefore react differently, facing an identical, stressful situation. Although there are individual differences in how much we react, the normal types of reactions can still be generalised.

We can never blame anybody for being stressed. It is not a voluntary or self-chosen reaction but an automatic, out-of-control individual response to a situation. We can, however, blame people for voluntarily putting themselves in stressful situations.

Effects on consciousness

Even mild or moderate stress can affect us by making us lose peripheral information. This is often called "narrowing of attention" or "tunnel vision", although it is not the vision that is affected, but our mental capacity to handle information. Narrowing of attention is therefore not the best choice of words. Narrowing of attention implies that we disregard some information while we are attentive to other. Instead it should be labelled *narrowing of consciousness* because in most cases we are only aware of information from a limited part of the environment and more or less unconscious of information that happens to be outside our focus. In other

words one can say that we are focused but in a shielded way. We concentrate our resources on a narrow part of a scenario, and other information, however significant, is mentally shielded off and does not reach our consciousness.

Narrowing of consciousness probably served us well at times when threats were clear-cut and distinct. But in a more complicated world with rapid changes and with more information to process, such a shielded focus is doomed to make us lose our overview, thus disregarding other information, significant changes in the environment or new information that could be more important and would better serve our interests. Narrowing of consciousness is by definition bound to result in a deterioration of situation awareness².

Effects on intellectual functioning and decision-making

It is a general observation that stress adversely affects intellectual functioning such as analytical thinking, problem-solving and decision-making. Stress has a restrictive effect on analytical thinking, thereby making a person more rigid. Consequently, flexibility decreases and so does the capacity for evaluating or even considering alternative actions. Long- and medium-term perspectives are also affected, resulting in consequences of actions and decisions not being properly evaluated. Decision-making runs the risk of being restricted to short-term solutions to imminent problems only, and tends to be linear, addressing partial problems as they occur, one at a time, instead of taking into account a broader perspective necessary for managing more complex courses of events. This in turn can lead to "decision overflow", a great number of decisions during a relatively short period of time. When one short-term decision doesn't seem to be effective, further decisions and corrections may follow, even before the previous decision has been acted upon. Decision-making under stress is re-active and normally not pro-active. An especially ominous form of stress reaction hampering a realistic attitude is, when in the midst of a crisis, someone absurdly denies the severity of a situation or the difficulties that lay ahead. A milder but still ominous form is when someone indulges in wishful thinking.

Effects on emotions

A severe level of stress can result in an individual being overwhelmed by emotions. In such a condition, the individual runs the risk of losing contact with his or her intellectual functions and could therefore cease to perform at a habitually more mature and advanced level. An individual might lose contact with knowledge, training, experience as well as rational thinking, and may therefore act mindlessly. Exceptional levels of stress can be traumatic and make an individual totally incapacitated and unable to function.

One such severe and traumatic stress reaction is panic, meaning that an individual's level of activity and excitement dramatically increase but the activity and energy released are purposeless, bewildered or disorganised and not governed by the intellect. Another sinister

² "Situation Awareness is a rather well-defined concept in some areas of the working and military life, (see "Human Error in the Maritime Industry"). A brief explanation is: The ability to picture a situation correctly and to know what is going on around you."

reaction to traumatic stress, at the other extreme end, is paralysis, i.e. the person stops acting at all, remains stiff, stops taking in information and seems to withdraw psychologically into a private world, leaving the real one. Individuals under panic or paralysis are dysfunctional, they shield themselves and set up mental barriers to the environment and do not take in anything anymore. They may therefore be difficult to get in contact with. Panic and paralysis may incapacitate anyone under extreme conditions. Attacks of panic and paralysis are, however, rather rare reactions for grown-up individuals. Other malign reactions to severe stress are feelings of helplessness or hopelessness. Depressive tendencies and resignation are also reactions harmful to rational, constructive and effective behaviour.

Stress may lead to difficulties in containing emotions, which in turn may have consequences for teamwork. The repertoire of stress reactions is individual and also dependent on levels of stress, but the emotional state can range from misplaced tranquillity or even elation to uneasiness, nervousness, agony and anger.

Hyper-sensitivity and anger are common reactions, reaching from slight irritation to outbursts or even downright tantrums. Irritation and anger due to stress are often loud-voiced but lacking in usual power and authority. Stress makes some lose patience with others easily, makes them sensitive, easily disturbed, rude or agitated. Stress-induced irritation may also express itself through excessive swearing.

Still others may react with silence, showing that they don't want to communicate or be disturbed. Even absent-mindedness and tension-induced repeated yawning might in some cases be signs of stress, as can misplaced and repeated nervous laughter. Others can excel in negative thinking and spelling out loud their negative thoughts and worries, at times with an inappropriately loud voice, often repeating him-/herself, without addressing anyone in particular.

Effects on somotoric functioning

Stress also affects the body, motor activities and behaviour in an observable way. Stress can show up in irrational behaviour, e.g. when someone repeatedly starts activities without finishing them. Other repetitive behaviour is when unnecessarily checking the same things over and over again, as if the person has lost faith in his/her own senses. Hyper-activity and difficulties to maintain concentration or keep still are other forms of stress-related behaviour.

Definition of Stress

Because stress is a concept in many different areas of life and with different meanings for different people, we have to define it. A definition that covers both the individual and the environment is needed because stress is a response to how an individual perceives the environment. A widely used definition provided by Lazarus and Folkman (1984) is as follows: "Psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 19).

The advantage of such a definition is that stress is treated as an individual response to an environmental situation. Individuals are not alike; we have various strengths and weaknesses and environmental situations can be experienced differently by different people. In this definition there is also a relation to the individual's well-being, i.e. the situation should include some kind of threat to the individual –physically and/or psychologically. Shalit (1988) adds a valuable comment. He sees stress as the amount of energy needed to restore balance. When an individual is at balance or when there is equilibrium between the outer and inner worlds, there is no stress. Stress is a tension inside an individual indicating that there is some kind of defective balance or a lack of equilibrium and that the individual is mobilising resources to restore it.

Stress and Human Mistakes

It is widely known that stress hampers our capacity, and this general knowledge is also supported by both research evidence and empirical findings. Stress can be both rational and irrational, but the focus of this article is not all the manifestations of stress. We have to limit our scope to three different subgroups of stress that are important for understanding human mistakes: *acute stress*, *apprehension stress* and *leader-induced stress*.

Acute Stress

This is the kind of stress someone experiences when meeting a difficult situation, a crisis, an emergency situation or an acute situation that is so demanding that the individual has to mobilise all of his or her resources to master it.

Acute stress is the psychological consequences of an individual meeting a situation that is perceived as an imminent threat, requiring prompt action and that is appraised as possibly exceeding available resources. Salas, Driskell and Hughes (1996) add a further explanation that is suitable in this context: "Acute stress is illustrated by the prototypical 'emergency' situation in which a scenario unfolds rapidly, the task must be dealt with in a short time period, and the consequences of poor performance are immediate."

Acute stress is a reaction tightly coupled with fear. It is a natural reaction when facing something dangerous or when involved in a situation that is unfolding dangerously.

Acute stress includes an increase in work load, meaning that an individual or a team must handle and attend to several things simultaneously or in a short period of time. Where there is a heavy work load there is also, by definition, a shortage of time. Heavy work load as well as time shortage are significant elements of acute stress and also stressors, each in their own right.

Acute stress is the psychological result of facing an imminent danger, to one's own or others' lives, to the environment or to economic values. To this kind of stress we must also add intrapsychic stress, i.e. stress originating from within the individual. Such stressors can be fear of professional failure, fear of damaged self-esteem, self-image and professional pride, fear of

damaged reputation, fear of superiors as well as fear of pending investigations and possible legal or professional consequences.

Apprehension Stress

This is the kind of stress someone experiences when anticipating a coming difficult or critical situation. Apprehension stress is the gradual increase in stress level when someone foresees an inescapable situation, appraised as critical or difficult to master and with a potential for error or professional failure. Apprehension stress is not as dramatic as acute stress. Apprehension stress may begin faintly, hours or even days prior to the difficult situation and gradually increase with proximity to the situation. Apprehension stress thus starts at a time when still not yet in the presumed difficult situation and ends when any reason for anxiety is over. The origin of apprehension stress is anxiety, not fear, because an emergency situation has not yet developed.

Leader-Induced Stress

Stress can also be generated inside a team and seriously hamper teamwork. Leader-induced stress is real, from a threat point of view, in the sense that the leader has influence over each team member's career. To displease a leader could therefore give negative consequences for promotion and further employment. A team leader who is dominant, categorical, who easily feels questioned, who is unstable or easily irritated, could therefore represent a major stressor to any team.

When facing a tense situation, team members have a tendency to automatically rally around their leader. In a tense situation, the stress and anxiety that team members are subjected to makes them prepared to follow orders and to fulfil their part. This is valid in cases where the stress or anxiety among team members is not overwhelming and as long as team members have faith in the leader's capacity to contain the pressure and to professionally handle the situation.

There is no need for a leader to prepare any team by acting in a specially authoritarian way. Respect can not be demanded, respect can only be earned. By acting harsh, distant, aloof or deliberately authoritarian, a leader can, however, induce fear. Fear causes stress, respect doesn't. A leader who behaves professionally and according to his or her true personality without playing any roles, gains more respect because team members easily see through false facades, even after only a short period of time. (Besides, playing a role inevitably must indicate that the person doesn't believe he/she will do as he/she really is.) To this we can add a universal truth: Good teams always have good leaders.

Stress and Teamwork

In order to constitute a team, there must be a team leader and some form of team structure where team members have defined roles and responsibilities. Acute stress on the team leader and members causes strain on a team structure and the team runs the risk of disintegrating at the very moment its efforts are needed the most.

Ample research on teams show that when stress increases teamwork runs the risk of being affected negatively.

In cases where the stress level is increasing, the team leader might take over and place too much responsibilities on his or her own shoulders. The team leader thus becomes quite busy and also increasingly stressed. What should have been a team effort runs the risk of gradually becoming a one-man operation. If the team leader takes over and attends to most upcoming tasks, other team members are reduced to the role of helping hands, at best executing orders from the leader, at worst being even further reduced to merely passive bystanders. Team members, more junior than the team leader, are prone to take a step back when they feel they are not needed or when they are uncertain about what strategy the team leader is following. If so, they avoid interfering with what the team leader is doing. Along with this state of affairs, team communication breaks down and, inevitably also, team situation awareness.

Stress Tolerance

It might be important so sum up and to illustrate what stress tolerance is and how it affects behaviour. Stress tolerance (Marine Profile, 1999) is an individual's capacity to withstand stress without undesired and irrational reactions. The level of stress tolerance is dependent on how much tension, anxiety or fear an individual is able to withstand and how he/she is influenced by stress. Individuals can be affected in a way that heightens their capacity, but when stress increases, an individual might be affected in a way that diminishes his/her ability to master a situation. The level of stress tolerance is the result of an individual's emotional reactions and how much these emotional reactions interfere with and disrupt intellectual capacity, perception and motoric skills, as well as mature, knowledgeable, composed and effective coping behaviour. Being in a responsible position can increase an individual's capacity to withstand stress. All humans are believed to have limitations in stress tolerance, as well as individual breaking points where capacity for coping ceases.

A high level of stress tolerance is evident when an individual maintains good, effective and productive coping mechanisms, when an individual has good situation awareness and has intellectual contact with his/her training, knowledge and experience without being overwhelmed by emotions. Such individuals stay rational and cool and are not easily fatigued. They stay in control of the situation and they maintain their simultaneous capacity, often with intensified consciousness. They display energy and drive and are active – without being hyperactive – and quite composed.

To get a perspective on stress, it might be valuable in this context to also mention something about signs that are contrary to stress – indications implying that a person, even in tense moments, is utilising his or her full potential. Naturally such a person is calm and composed and because stress has a tendency to pass over to others, such a person spreads confidence and calmness. When there are signs of presence of mind, concentration, vigilance and acuity there is no stress. There is an air of efficiency and self-control around such a person. He or she is able to use personal energies and resources in a distinct and rational, yet balanced

manner. The body language is natural and effective and so are the movements. The person utilises other resources, such as team members, in a natural and methodical manner, keeps a good overview and has foresight. The person does not lose authority and teams up smoothly with others, filling his or her part in the team. A person that is not stressed is proactive and without negative thoughts about the current situation.

”Positive Stress” and Challenge

People sometimes refer to something they call ”positive stress”, i.e. a ”stress” that sharpens and mobilises an individual’s capacities. The reasons why this is labelled ”positive stress” is probably twofold. Firstly, because it normally involves positive emotions closely connected with excitement, thrill and even pleasure. Secondly, because this kind of sensation is triggered by conditions or situations in the environment that under other circumstances, and for other people, could be stressors, i.e. sources of fear or anxiety.

Instead of using the term ”positive stress”, I prefer the distinction made by Lazarus and Folkman (1984) where they label such a situation as *challenging*, not as stressful. Stress is by definition not positive. A challenging situation can be any situation that is not threatening, that involves some kind of effort and where the challenge is voluntarily met by a person who expects personal gain from taking on the challenge.

A challenging situation is a situation that is deemed to meet someone’s capacity, not exceed it, and the personal gain could be such things as excelling, demonstrating skill or courage or proving something to oneself. A challenging situation could also mean mastering a professional and tricky situation of a degree of difficulty that not everyone could master. Many people experience a pleasant feeling when functioning at the very top of their resources.

Outside the professional field there are lots of illustrations of such challenges and numerous people who seek them, e.g. venturesome people who experience a pleasant thrill when on the edge of their capacity and where the challenge takes a lot of will-power to meet. Often these challenges are seemingly dangerous, however avoidable, and relatively controlled situations such as making a bungyjump, a parachute jump or outdoing oneself in racing, off-piste skiing, mountain climbing and the like.

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