CHEMISTRY OF CHALLENGE AND WHEN IT MORPHS INTO STRESS

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The brain works through electrophysiology and bio-chemistry and is the best asset for both individuals and organizations. Businesses can recruit the best brains but it takes Emotional Intelligence to guide them to a zone of optimum performance. This articles looks into the physiology underlying the spectrum from boredom through flow on to stress perception and panic. It discusses the factors that generate stress and suggests ways to minimize them so as to maintain health and vigor. Anger, its effect on the body and tips to manage this emotion is followed by a look at natural coping strategies with the role of relationships in attitude, health and stress management.

I- Consider the continuum:

Boredom-Attention-Performance/Learning-Flow-Anxiety-Panic-Burnout.

Where in this spectrum do you place yourself now and where would you like to hover most of your time? If we could clock the time we spend at mid-zone it would be a measure of the fulfillment we experience from life, but if it were to come out that more time is spent at the far right of the spectrum, insurance companies would hike up our life and health insurance premium or perhaps even refuse cover on the grounds of 'living on the edge'. Some think it is 'cool' to be stressed out and then to seek out 'stress-busting' avenues. Ask your body and it will tell you. It has been trying to speak to you and continues to communicate but is anybody listening? The brain is a highly distractible organ, clogged with hang-ups and as you will see, rendered ineffective during stress. Alarm bells ring on systems that have been turned off. This article will try to demystify the processes relevant to the boredom-burnout spectrum, so that we attune the body and brain and guide them to the fulfilling zone, maximize joy and perform to the best of individual potential

The language of the brain is electrical and chemical. Along the length of a nerve fiber a stimulus passes electrically, but at the synapse (connector nodes) the signal has to jump a gap. The jump

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cannot happen without a neuro-transmitter molecule that bursts out of one bulbous nerve ending and connects chemically with the cell membrane of the adjacent neuron (nerve cell). Unlike electrical connections that are wrapped or soldered together making transmission inevitable, a brain cell responds selectively depending on the presence and type of the bridging chemical. Hence we sometimes refer to the brain as 'Wetware'. It is a biological marvel, our best asset, and to use it optimally we must try to befriend it if possible.

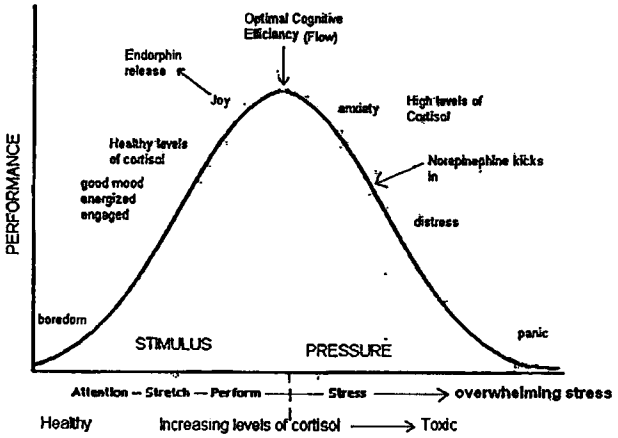


Fig 1
Cognitive Performance in relation to Cortisol Level

At High Levels Cortisol is a Mediator of Effects of Stress
Optimization is a challenge, and to optimize challenge is an art. The familiar bell curve is the optimizer's favourite graph and here it depicts performance on the y axis and Cortisol secretion on the horizontal axis.

A bored person's brain resists focus of attention. Regardless of immense intellectual potential (IQ) in the presence of insufficient cortisol stimulation, levels are low there is almost no motivation to get up and going and cognitive performance cannot even begin. Low cortisol by itself means nothing except lethargy and boredom. What matters is how the adrenal glands respond to a stimulus (How do I catch your attention?). The process that makes us attentive works by stimulating the middle brain, (subconscious level), wherein emotions reside in close proximity to circuits that control physiological

mechanisms (Hypothalamus). The proximity ensures instantaneous transmission of signals of interest via a hot-line to the adrenal glands causing reflex secretion of cortisol from the adrenal cortices. Adrenal glands are placed close to the kidneys rather far from the brain, but connectivity of this hot-line (Hypthalamo-Pituitary-Adrenal Axis or HPA) is built robust enough to carry most life-saving reflexes such as reactions to Fear. Since HPA originates in the middle brain, a stimulus has to have an emotional component in order to excite the HPA to secrete cortisol, which in healthy doses keeps us attentive and energized.

Cognitive brain motivation happens when an emotional chord is touched via a person's thinking upper brain appealing to something the person cares about, e.g. quest for knowledge, achievement drive, love for the cause, urge to make a difference. These can be powerful stimulators and once charged may sustain themselves. A once-in-a-lifetime message may be internalized to inspire forever. Subconscious levels of ego needs are located below the thinking cortex. The need for money, popularity, fame or power and innate competitiveness can be tapped to arouse interest and enthusiasm. These stimuli may run out of steam so coaches have to keep boosting with pep-talks. Other ways to pump up the HPA is the primitive method of invoking fear, anger, hatred or revenge. The primitive and base motivators are also very powerful because the brain is wired to respond to threat perception instantaneously, while by-passing the thinking levels so effectively that as long as the threat persists the best brains just stand and blink idiotically. Base motivators seldom encounter questions and succeed by prolonging threat perception (HPA slips into overdrive).

Humour is an effective adjuvant. A good laugh appeals straight to the emotional center, raises the level of curiosity and interest and allows certain openness by connecting emotional levels and facilitating whole-brain activity.

As cortisol surges into the bloodstream in response to HPA activation, interest and enthusiasm rise. The mood is up-beat, there is energy and engagement. There is sense of 'stretch' and innate, dormant abilities are realized and discovering one's own potential is a pleasant bonus along with the rewards of achievement. During a familiar task, delicately balancing the pressure to match the potential

eases the person into 'Flow' state. It is a time when actions flow smoothly, gracefully, effectively and the person feels energized and more alert at the end of the performance, rather than fatigued. The person in flow experiences joy, releases endorphins and steps on to a positive state of peace, physical and psychological health.

In reality, the golden goose (High Performer) is harassed with unrealistic expectations and absurd deadlines. Every goose is not the same. Like the strings of a guitar, each one is of different caliber. If the same twist is applied to each string one may jangle loosely, another sing, the fourth may shriek and the sixth may snap! A certain amount of empathy is required to match the torque to the caliber.

Lack of sensitivity to individual capability causes application of higher pressures than we can withstand and pushes us over the top of the bell curve, whence anxiety is felt. Demands loom and are perceived as intimidating (fear-like experience), so instead of joyous endorphins from the brain; nor-adrenaline (nor-epinephrine) begins to guzzle out of the adrenal medulla. This is when people begin to lose their tempers. Blood pressure and blood sugar rise and the thinking brain blacks out. Cognitive performance goes apoplectic, mistakes happen, time is lost and deadlines glare at us in the face. Work is no longer a pleasure; it is distressing and leads to panic and misery.

Nature knows that the 'thinker' is too slow to be eligible for 'Life Saver' duty. When the Amygdala (Emotional Center of the brain) perceives distress it commandeers the thinking brain – side-lining it for the duration, diverting its resources to achieve a state of battle-readiness. It replaces decision making with automatic reactions. The Emotional Center behaves undemocratically like 'Big Brother' and hijacks attention – turning it to the stressor and away from the task (e.g. lack of time or comparison with others). Attentiveness and concentration is replaced by hyper-vigilance, making us 'jumpy'.

Cognitive dysfunction leads to temporary suspension of:

- Learning
- Holding information in working memory
- Flexibility in thought
- Creative thinking
- Focusing attention at will

- Planning
- Effective organization
- Pursuance of goals

Amygdala hyperactivity results in activation of the right side of the pre-frontal cortex giving rise to negative moods (worry, resentment, sadness or anger)

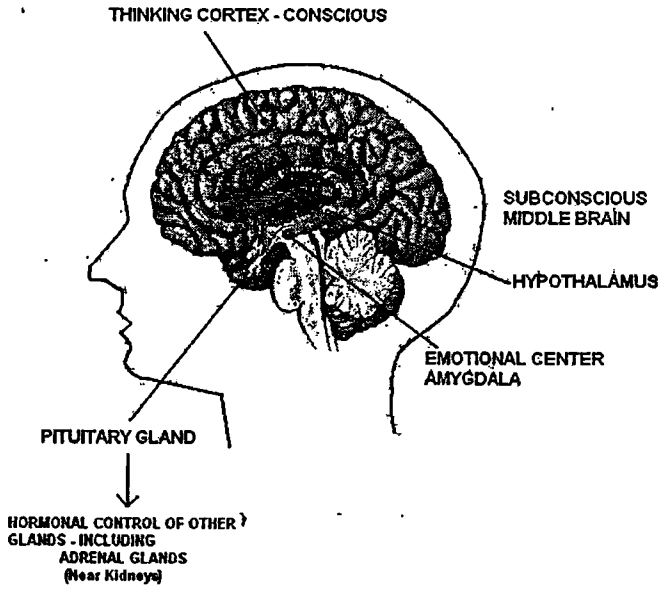


Fig. 2 :
Conscious & Subconscious Levels of Brain

Emotions and Control of Heart Rate, Breathing, Blood Pressure – Located in subconscious Mid-Brain, close to Pituitary Gland. All Connections with the rest of the body pass through the base of the brain. Conscious actions are slow, subconscious reactions are quick.
Leaders are expected to recognize the limits to which the team-members can be challenged, crossing this line challenge turns into stress.

Stress is defined as 'a condition or feeling experienced when a person perceives that demands exceed the personal and social resources the individual is able to mobilize' – Richard S Lazarus. The key-word here is 'perception' and is something that can change

with awareness and shifts in attitude. When a friend exhorts you to 'Chill' you should get the message. Many of the 'demands' upon us are self-imposed.

The responsibility of perceiving a threat is squarely upon us as no one can perceive anything for someone else. A certain security about identity and internal comfort with personality and self-image are essential to minimize competitiveness and hostility. We often mistake an attack on our ideas and methods as an attack on our identity. The forum on which ideas and execution compete is open and we have to be open enough to let the best idea win. If my idea loses a race, the idea is a loser – not me.

Discomfort with self-image will make me hungry for appreciation. I may try to project my brilliance and accolades take supremacy over the task. Small mistakes will crumple the ego severely and cause suffering of ridiculous proportions. This sort of internal suffering has adverse effects on health and well-being. Hence responsibility for peace of mind lies within one-self and is intricately and chemically woven with Positive Health.

Negative moods, despair, helplessness, depression when extended over long periods cause stress. The reverse is also true and chronic stress often leads to depression. It is true that we cannot decide what mood we will be in and when, because external events change our moods. But we can regulate the period of a mood and learn to snap out of negative ones. In general we have a back-ground mood (cheerful to sullen) that is often mentioned when people describe a personality – something like a signature mood. We can choose our signature mood and must own responsibility for having chosen it. Closely linked with mood altering endogenous chemicals is our resistance to disease, known as immunity.

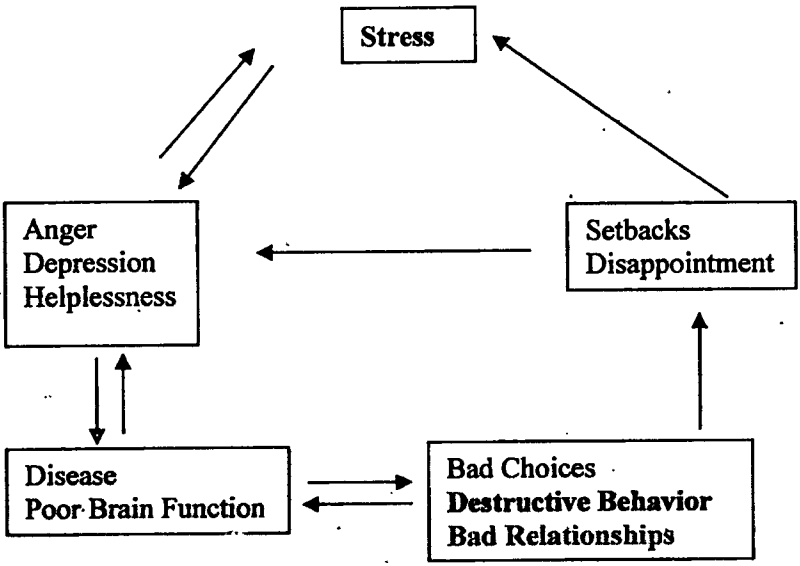
II- The Immune System

Immunity is the system that strengthens, heals and repairs the body. It keeps untiring vigil to detect invaders and fights infections while mopping away the spoils of battle. Immunity is paralyzed by stress. The repair and replacement undertaken in the human body on a daily basis is phenomenal. Consider the following facts:

- Stomach lining is changed every 4 days
- Red cells are replaced in 120 days
- The skin is new every month
- Liver can renew itself in 6 weeks
- Even the skeleton is refreshed in 3 months

At times when the country is at war, developmental activity takes a back-seat. So when the body perceives stress, all resources are diverted to action stations (muscles) depriving peace-time systems like digestion and maintenance.

As we already know, the thinking brain is by-passed during stress, now we find that the protective mechanism of immunity is also compromised simultaneously. Together these phenomena create a vicious cycle and make careers spiral downwards under the influence of stress.



Vicious Spiral of Stress

The notoriety of Stress as a cause for disease is common knowledge. Every disease can be brought on or exacerbated by stress. A very concise list of Stress –Linked Diseases is given below:

- Asthma

- Arthritis
- Headache, Backache
- Peptic ulcers
- Heart disease
- Increased susceptibility to infections and cancers due to suppression of the immune system
- Early onset of diabetes
- Increased requirement of insulin
- Brain damage – poor memory

External Stress

Though we may take responsibility for self-inflicted pressure of demand and expectation, there is little we can do about how the world treats us.

Common External Causes of Stress:

- Serious financial trouble
- Job crisis
- Lawsuit / divorce
- Isolation / love-lessness
- Illness of self or family members
- War / political instability
- Harassment

Since internal and external factors are eventually going to take a toll on health I am deeply concerned. I recommend that we acquire some basic understanding of points of generation of Stress so as to nip it in the bud.

Internal Causes of Stress

- Ego, Self Esteem
- Disease, Disability
- Expectations
- Inability to Regulate Emotions
- Unrealistic World View
- Inability to shake off Prejudice
- Discomfort with Sexuality
- Inability to Move On
- Relationship Demands
- Work-Life Imbalance

A proactive approach would involve finding time to educate our-self about ego, anger, emotional intelligence, healthy attitudes and healthy relationship boundaries. Constructive introspection can achieve self awareness, and counseling can be sought with the aim of attaining a state of Positive Health. We will still require organizational support and although most HR executives are aware about the benefits of Emotional Intelligence to individuals and organization, they may remain ineffective if the top management remains unaware or disdainful. As a result people are left to their own resources to beat stress.

III- Beating Stress

Journaling

If you already are in the habit of writing things down, realize the importance of this habit. If you do not keep a diary, start writing today. Writing down things we need to remember takes the stress away from the Hippocampus (memory center of the brain). Of course you can keep exercising the memory to keep it fit, but do it with fun intended, not with things careers and relationships depend upon. Remember that having a good memory does not indicate a great intellect. A journal however has to be more than just a to-do list. It has to be a companion. You can use it to get in touch with your inner core, to express deep emotions, to get in touch with unexplained fears, insecurities, anxieties and sometimes use it for venting feelings privately. A journal is more private than a blog.

The coping support obtained by expressing inner thoughts and feelings has positive impact on the Immune System. Studies conducted on immuno-compromized patients as well as on cancer patients have demonstrated bolstering of immune activity after the participants started writing a diary.

Relationships

A journal / diary can be a friend and companion but real friends and pets have a more important place in our lives. Relationships are generally thought necessary to make life worth while. In relationships that are professional, personal, sexual or otherwise, the social structure of the brain forges links between friends and significant others at a subconscious level working through 'mirror-cell' systems that create empathy and rapport. Unknown to us

attunement occurs harmonizing heart-rates, respiration, moods and neuro-chemicals. Neuropeptides associated with positive emotions boost the immune process. A good friend / spouse / team-mate thus entangle us as a psycho-biological unit. Hence we physiologically miss each other when we are apart and sometimes death of a loved one causes life-threatening levels of stress (heartbreak). Gather your friends about you to stay healthy and strong. Fulfilling relationships, dependable partners and friends can cancel the toxic effects of stress on health.

Counseling and Therapy

Most instances of disharmony within the internal physiology (dis-ease) are taken care of by the immune system. But when an infection goes out of hand, or we just want to get well quick, we do seek expert advice. Psychology is also a function of physiology, cells and chemicals. Discomfort at a psychological level justifies expert intervention. If we try and fail to straighten out psychological problems, putting off professional guidance only prolongs the stressful effects of cortisol upon the rest of the body, lowering general health status and resilience. Seeing a 'shrink' is something we are afraid to do because of the stigma attached. The process begins with acceptance of the fact that we do have a problem. The sooner we allow intervention, better the results.

Anger Management

Anger is a useful emotion, especially at the workplace: In some professions anger has to invoked and woven into the body language in order to get desired results. As an emotion anger is as indispensable a tool as fire. The potential hazard associated with fire does not outweigh its usefulness. Hence we use it with safety measures firmly in place. First one must be mindful of anger. We wire our offices with smoke detectors but fail to familiarize ourselves with the smoke from ire. Each person has his own physiological signature smoke signal. Often others are more familiar with our pattern than we are. Ask and they will readily tell – if you promise to listen without reacting. If they say it is evident in your facial expr sion, keep a mirror handy.

Once aware of stirring anger it is brought to the level of the thinking brain. It is only in the thinking levels that logic and analysis can be applied and a quick checklist can be run:

- Is this important?

- Is it a matter of grave significance?
- Am I expecting someone else to change? – I cannot change anyone except myself
- If I can't change this can I learn to accept it?
- Are my standards too high?
- Is there something beneath this anger –Am I jealous?
- Is this anger or disappointment?
- Am I a control fiend?
- Should I really care this much?

Put a copy of this check-list under your table glass for quick reference. If you have even asked yourself the first question you have already engaged the thinking cortex. You have precluded 'reaction' and due to this delay you cannot fly into a rage. Whatever you do now will be a considered 'response'. If the situation demands it, you can act out a rage but acting will not harm your heart and blood vessels.

Of all emotions, anger – which is really a gush of noradrenaline (norepinephrine), has maximum impact on the heart. In its urgency it stimulates heart muscles but in a way that causes it to be inefficient as a pump. The flow in the arteries becomes turbulent causing micro-tears and damage to the inner lining (endothelium), forming a nidus (bed) for plaque formation. Eventually these plaques will complicate life and become a ticket to the ICU. Is this (the cause of your anger) really that important?

Anger control training has shown significant efficacy. On a group of people who had already suffered one heart attack, the training was effective in reducing occurrence of second heart attacks by 44%. Why wait for the first attack – get help now!

Self Awareness

Being mindful of the self is not only a health requirement; it is also an indicator of success in later life. (Ref) On the first page of your new diary I suggest you list out your personal core values and on the other column write down your deepest fears. You will find that sometimes just identifying a fear reduces its intensity. If your

personal values are not in tune with those practiced by your organization you will be able to identify the reason for your lethargy and uncover a major stress generating center i.e. conflict of core values.

IV- Nature's Own Coping Strategy

To counteract the toxic effects of stress that we have not been able to avoid we have to proactively find and produce an antidote to toxic levels of cortisol.

STRESS MEDIATOR CORTISOL IN TOXIC DOSES	HAPPINESS HORMONE ENDORPHIN
By-passes the Thinking Brain	Engages and Facilitates the Thinking Brain
Reactive Behavior	Responsive Behaviour
Broken Relationships	Improved Relationships
Depression	Fulfillment
Fatigue	Energizing
Suppresses Immune System	Enhances Immune System
Raises Blood Pressure and Sugar	Lowers Blood Pressure

Endorphins are secreted by the emotional level of the brain. It produces a state of naturally induced euphoria and doubles up as an endogenous pain relief system. If we want to naturally increase the availability of this happy hormone in our body we need to know what activities pump up endorphin secretion:

- ✓ Being Happy
- ✓ Work Satisfaction
- ✓ Achieving state of 'Flow'
- ✓ Creative Pursuit
- ✓ Exercise
- ✓ Laughter
- ✓ Meditation
- ✓ Helping Others

From the list above we can see it really is quite easy to counter-act stress. Everyone is not lucky enough to experience happiness and work satisfaction. Happiness is really a state of mind and shifts in

attitude and world-view do improve levels if one is ready to make changes in mind-set. Work satisfaction can improve if one learns how to celebrate small victories and appreciate one's own work. Having a hobby or an alternative avenue for self-actualization, like music, arts, home-making, can fill in the deficiency one experiences from not achieving satisfaction at work. The rest of the list is within everyone's reach.

My readers have always been aware that exercise is good for us, but some have a problem motivating themselves to get moving. A gentle reminder about motivation at the level of neurology is that you really have to find a cause for which you care deeply from the subconscious core of your Amygdala (Emotional Center). Connect that cause with exercise and you will find yourself taking the stairs, fetching your own coffee and walking around the block after lunch.

The idea of meditation need not be a daunting one. Meditation does not necessarily imply *Padmasana* and *Om* or rosary beads. Any activity during which you apply your full attention and mindfulness works just as well. To a dancer, the performance may be a meditation; a golfer may benefit while practicing his swing, creative hobbies, music, martial arts and giving full attention and attunement to children or to a close friend can substitute the conventional idea of meditation as long as you are applying 100% attention.

If you run out of ideas just help someone when you are free. Did you know that the feel-good you experience after helping someone is due to endorphins released in your own brain? So helping someone else may not be so unselfish after all - and it could even cure your backache!

Feeling good, feeling distressed, fearful, angry, all happen because of specific chemicals released and mopped up in the body. A chemical equation is often reversible. So when we are happy we laugh. If we laugh we become happy. This is the basis of laughter therapy. Try it – it works. Most of the feel-good and loving chemicals e.g. endorphin, dopamine, serotonin, oxytocin make the brain work in a wholesome way, connecting left and right hemispheres and improving information flow within the cortex. A net-worked brain is efficient and creative. Creativity dissolves away in the face of fear,

anger, stress and indifference as these states shut down most of the cerebral cortex.

Researchers studying oxytocin – the hormone of loving behaviour, have found that while oxytocin levels are maintained an individual displays generosity and trust, bonds easily and strengthens emotional attachments while keeping healthy relationship boundaries. Those who are in secure relationships show better response patterns. Since relationships are what drive business and performance, oxytocin is certainly a major factor in both personal and professional life, further blurring the lines between these. Since demands of Work and Life are known to pull a person in opposing directions and become a point of generation of Stress, employers and Human Resource Managers must take notice and monitor individuals to ensure that they are coping by balancing work and personal life delicately. Much of the oxytocin flowing in the employee's blood is there because he does have a life, fun and fulfilling relationships.

It is clearly evident that an individual's internal environment, his hormones and neuro-chemicals, are working for the business. Organizations need to 'Care' about 'Health' of both individual and company. 'Health' is hollow unless it is backed by resilience and reserves. Stress erodes every tissue, weakening the work-force from within, damaging, sometimes irreversibly, the company's best asset – the Brain.

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