

## What is Anxiety?

Anxiety is a feeling of fear, worry and uneasiness about the expectation of future threat, where person may feel apprehensive or helpless.

These emotional-behavioral sets may arise in response to exteroceptive visual, auditory, olfactory, or somatosensory stimuli or interoceptive input through viscera and the endocrine and autonomic nervous system. Anxiety may also be produced by cognitive processes mediating the anticipation, interpretation, or recollection of perceived threat. (Drevets D. s.)

Anxiety is normal and is experienced by every living organism, right down to the sea slug. It is necessary in humans for survival and adaptation, and it is not in the least harmful or dangerous. Anxiety is typically short-lived, and in some cases moderate levels of anxiety actually enhances performance. (Dr. Neil Rector)

Anxiety affects the part of the brain that helps to control how we communicate. This makes it more difficult to express our self creatively or function effectively.

The physical symptoms for anxiety are same as stress, which involves sympathetic nervous system, however there are not many physical threats around us in our daily life for person to use of all the chemical responses generated by the mind and body. When anxiety persists in the absence of a need to fight or flee, it may lead to significant distress and impairment, which is an early sign of generalized anxiety disorder (GAD).

## Physical Symptoms of Anxiety Includes:

- Trembling, twitching, or shaking
- Sweating or cold, clammy hands.
- Light-headedness or dizziness
- Have stomach aches, or unexplained pains
- Sleep problems, such as the inability to fall asleep or stay asleep
- Muscle tension, aches, or soreness (myalgia
- Feeling of fullness in the throat or chest

## Emotional Symptoms of anxiety includes:

- Worry very much about everyday things
- Feelings of apprehension or dread
- Emotionally feel tired all the time
- Have trouble relaxing
- Hard time concentrating
- Feeling tense and jumpy
- Irritability

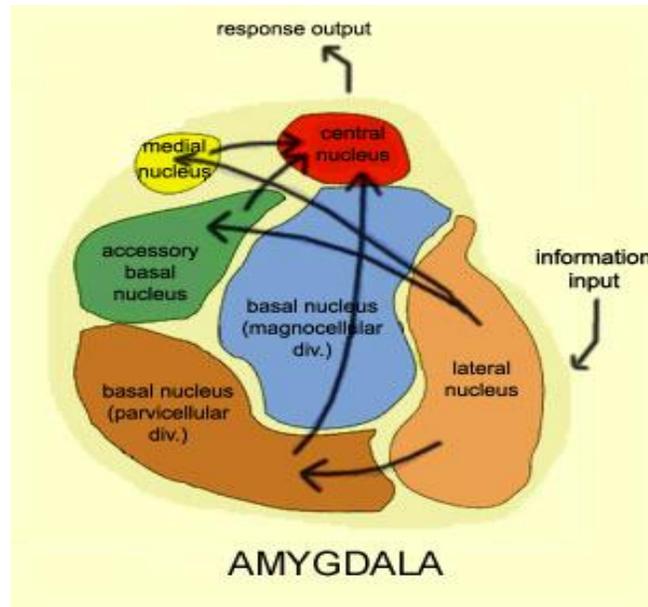
## Biological factors of Anxiety

The anatomic systems supporting fear learning are organized to permit both rapid responses to simple perceptual responses to more highly processed information about complex sensory stimuli and environmental context. (Drevets D. S.)

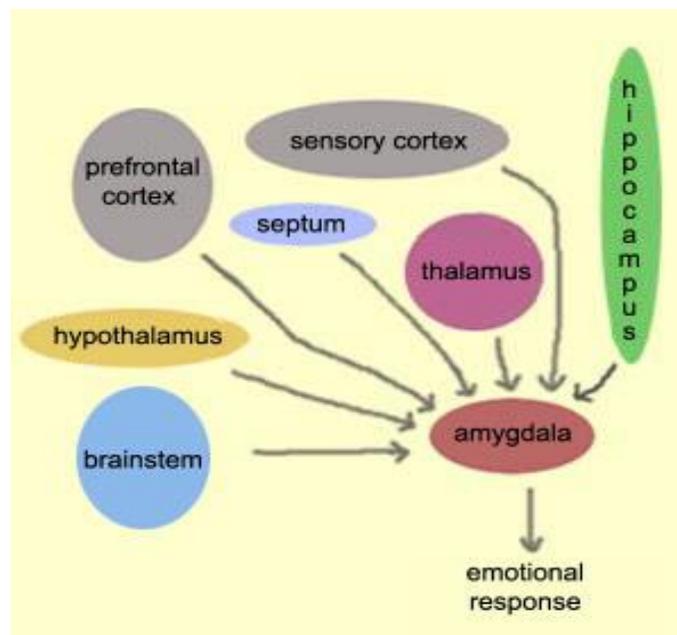
Our brain has three main parts (the triune brain), the Brainstem (Reptilian Brain), the Midbrain (Mammalian Brain, Limbic System), and the Neo-Cortex. During anxiety amygdala is triggered which are part of the midbrain (limbic systems).

The amygdala is an almond-shaped structure in the brain, an integrative sensor for emotions. There are two amygdalae, each amygdala is located close to the hippocampus, in the frontal portion of the temporal lobe. The amygdala modulate all of our reactions to events that are very important for our survival. It has many connections with several other structures in the brain.

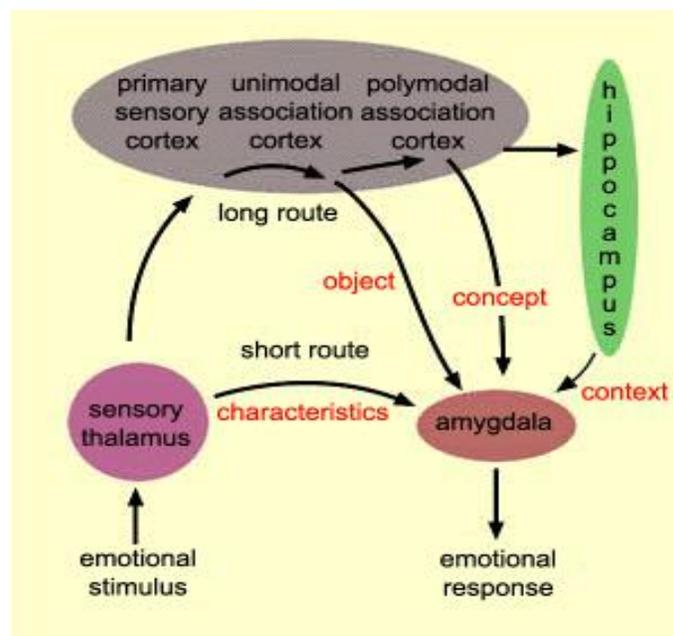
The Amygdala is complex structure of the brain and has 12 sub-regions, though not every region is involved in fear reaction but maintain the connection that participate in reaction actively. Amygdala receives the information from outside world through lateral nucleus. The central nucleus which controls the bodily reaction associated with fear.



The amygdala also receives numerous connections from the hippocampus and prefrontal cortex. Hippocampus is responsible for our memory function and activation which is based on previous experiences and explicit memories. The hippocampus also specializes in processing sets of stimuli (as opposed to individual stimuli) in other words, the context of a situation. Hence it is because of the hippocampus and its close connections with the amygdala that the entire context associated with a traumatic event can provoke anxiety. (Dubuc, n.d.)



The Thalamo-Amygdala Pathway (the “short route”) and the Thalamo-Cortico-Amygdala Pathway (the “long route”). The short route conveys a fast, rough impression of the situation, because it is a sub-cortical pathway in which no cognition is involved. This pathway activates the amygdala through its central nucleus, generates emotional responses before any perceptual integration has even occurred and even before the mind can form a complete representation of the stimulus.



(The brain from top to bottom, n.d.)

While the long route allows the information gets processed in the cortex then reaches the amygdala and tells whether or not the stimulus represents a real threat. There are various levels of cortical processing are required to provide the assessment.

The amygdala trigger leads to another structure call the hypothalamus. The hypothalamus regulates the autonomic nervous system (ANS) which is responsible for regulating your hunger, thirst, response to pain, levels of pleasure, sexual satisfaction, anger and aggressive behavior, and more. It also regulates the functioning of the autonomic nervous system, regulating things like pulse, blood pressure, breathing, and arousal in response to emotional circumstances.

After the amygdala sends a distress signal, the hypothalamus activates the sympathetic nervous system by sending signals through the autonomic nerves to the adrenal glands. These glands respond by pumping the hormone epinephrine (also known as adrenaline) into the bloodstream.

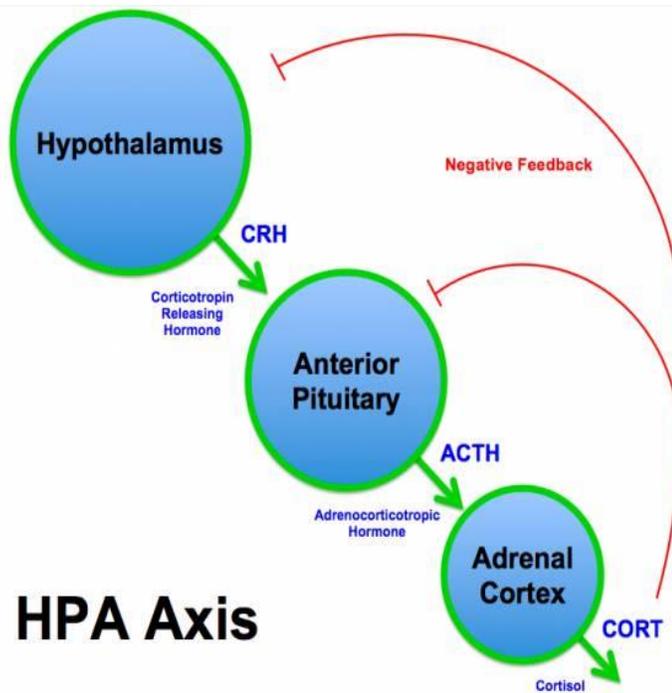
As epinephrine circulates through the body, it brings on a number of physiological changes. The heart beats faster than normal, pushing blood to the muscles, heart, and other vital organs. Pulse rate and blood pressure go up. The person undergoing these changes also starts to breathe more rapidly. Small airways in the lungs open wide. This way, the lungs can take in as much oxygen as possible with each breath. Extra oxygen is sent to the brain, increasing alertness. Sight, hearing, and other senses become sharper. Meanwhile, epinephrine triggers the release of blood sugar (glucose) and fats from temporary storage sites in the body. These nutrients flood into the bloodstream, supplying energy to all parts of the body.

As the initial surge of epinephrine subsides, the hypothalamus activates the second component of the anxiety response system — known as the HPA axis. This network consists of the hypothalamus, the pituitary gland, and the adrenal glands.

The HPA axis relies on a series of hormonal signals to keep the sympathetic nervous system — the "gas pedal" — pressed down. If the brain continues to perceive something as dangerous, the hypothalamus releases corticotropin-releasing hormone (CRH), which travels to the pituitary gland, triggering the release of adrenocorticotropic hormone (ACTH). This hormone travels to the adrenal glands, prompting them to release cortisol. The body thus stays revved up and on high alert. (understanding the stress response, 2016)

Gamma Aminobutyric Acid (GABA) is a chemical messenger, it occurs naturally in your brain, and functions as a neurotransmitter to regulate brain activity. GABA's natural function is to reduce the activity of the neurons to which it binds. Some researchers believe that one of the purposes that GABA serves is to control the fear or anxiety experienced when neurons are overexcited. High level of CRH and low level of GABA are associated with anxiety. (Without GABA nerve cells fire too often and too easily. (Bennington)

Persistent epinephrine surges can damage blood vessels and arteries, increasing blood pressure and raising risk of heart attacks or strokes. Elevated cortisol levels create physiological changes that help to replenish the body's energy stores that are depleted during the stress response. But they inadvertently contribute to the buildup of fat tissue and to weight gain. (understanding the stress response, 2016)



(Bannington)

When the threat passes, cortisol levels fall. The parasympathetic nervous system (PSNS) then dampens the stress response.

PSNS has its roots in the brainstem and in the spinal cord of the lower back. Activation of parasympathetic arousal include the following effects:

- pupil constriction
- activation of the salivary glands
- stimulating the secretions of the stomach
- stimulating the activity of the intestines
- stimulating secretions in the lungs
- constricting the bronchial tubes
- decreasing heart rate

The parasympathetic nervous system also has some sensory abilities like receiving information about blood pressure and levels of carbon dioxide in the blood.

## Yoga Therapy Intervention

While the goal of yoga historically has been to create a unity between mind and body along with our breath, to produce physical and emotional wellbeing. The goal can be only achieved through mindful practice. Research suggests that yoga can improve mood (Streeter, 16 November, 2010), anxiety, sleep disturbance, hypertension and headaches.

Yoga helps to regulate the breath and relax the body by gently releasing tension from the large muscle groups. It flushes all parts of the body and brain with fresh blood, oxygen, and other nutrients, and increases feelings of well-being. Sun Salutations are very helpful, since it involves the entire body, encourages the deeper breathing through rhythmic movements. Yoga Therapy is about the adaptation and acceptance to increase the stability and the mobility in our body. Yoga Therapy will be effective if it is practiced off the mat and on the mat.

### Off the mat Yoga

- Practicing Yama (external discipline).
- Practicing Niyama (internal discipline).
- Learning about the breath, watching how the breath is flowing during an anxious moment.
- Cognizant about anxiety triggers and making a note in a journal about the feelings.
- Enough sleep, nutrition and following routine.

### On the mat Yoga

- The state of your body directly reflects the state of our mind. Making a Sankalpa (intention).
- Strengthening the mind through moving the body (yog asana practice). Asana helps to release the tension and toxins from the body. Stimulate the circulation in the endocrine system.

## The Following asana can help to reduce the physical effects of anxiety

- Marjariasana (Cat Stretch)
- Adhomukha Shwanasana (Downward Facing Dog)
- Setubandhasana (Bridge Pose)
- Hastapadasana (Standing Forward Bend)
- Dhanurasana (Bow Pose)
- Matsyasana (Fish Pose)
- Janu Shirsasana (One-Legged Forward Bend)
- Paschimottanasana (Two-Legged Forward Bend)
- Shavasana (Corpse Pose)

At the end of the yoga asana practices, lie down in Yoga Nidra to bring the balance between sympathetic and parasympathetic nervous system minutes of through relaxation. The technique is helpful in flushing out body toxins, a primary cause of stress, from the system.

Practice of yoga asana along with breath and awareness brings many benefits to mind and body. Anxiety affects the mind as well. Taking our attention to the breath can help free the mind of the unnecessary clutter of thoughts that breed anxiety. The following breathing practices can bring the benefit to relax the mind.

- Kapal Bhati Pranayama (Skull-Shining Breathing Technique)
- Bhastrika Pranayama
- Nadi Shodhan Pranayama (Alternate Nostril Breathing) – effective in releasing stress from the system (where the exhalation is longer than the inhalation)
- Bhramari Pranayama (Bee Breath)

Knowing and applying the yoga philosophy in daily life, which talks about some simple and profound principles of yoga, to bring the wellness. Like Yamas and Niyams can help us to understand external discipline and internal discipline. The Aparigraha principle, which is part of Yamas can teach us non-attachment that does not mean, leaving everything and be a monk, however it will allow us to learn to let go and feel the power. For example Niyama teaches us the value of contentment through Santosha. It is not about be happy whatever you have but at least learn to not to be unhappy if others have or we do not have. We can always work towards to achieve it. The Shaucha principle talks about cleansing the body, through regular bowel movement. Bowel movement can tell lot of things about our health. The Yamas and Niyamas of yoga also help us the importance of eating nutritious food, which greatly helps to overcome anxiety.

It is advisable to practice with a teacher to learn yoga postures, mediation, breathing techniques and relaxation. Please find a teacher which resonates with you and be open to learn, absorb and accept to remove the rigidity of body and mind.

## Resources used for the research:

1. The Emotional Nervous System, General Psychology by C. George Beoree
2. National Institute of Mental Health
3. How your Brain can turn anxiety into calmness by Martin L. Rossman M.D.
4. The Institute of Functional Medicine
5. Harvey Simon M.D. Professor of medicine, Harvard Medical School
6. An Integrated approach to Psychotherapy, Eric Ryan Ph.D.
7. National Institute of Health, David S. Goldstein

